Food and Agriculture Organization of the United Nations

Are policies in Africa conducive to sustainability interventions in the charcoal sector?

A preliminary assessment of 31 countries

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Are policies in Africa conducive to sustainability interventions in the charcoal sector?

A preliminary assessment of 31 countries

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Foreword

Charcoal made from wood has been used as a fuel for centuries and is still widely adopted in many countries as an important cooking fuel. It is locally available, generally reliable, and affordable compared with petroleum, gas and electricity. It is also a relatively clean fuel, compared with wood or agricultural residues used in traditional cookstoves. This is particularly relevant for millions of people who live in urban and peri-urban areas and have limited options for energy sources for cooking. It is anticipated that a large proportion of people in African countries will continue to rely on woodfuels in the near and medium term, in the context of population growth and increased urbanization, with serious implications for already declining forest cover.

In many African countries, the share of woodfuel in total energy consumption is extremely high, with complex socioeconomic and environmental implications. Concerns related to this practice include repercussions for deforestation and forest degradation, greenhouse gas emissions and climate impacts, access to energy services, indoor air pollution and health, livelihood support and income-generating opportunities, and gender equity.

In most countries, the charcoal sector operates around a nexus that includes energy, forestry, agriculture, food, water, environmental and natural resource management. To address the challenges of the charcoal sector, some countries have formulated policies, regulations, strategies and programmes for interventions from various perspectives.

A study on how charcoal is addressed by national policies can help to better understand how countries perceive the issues and concerns related to this energy source, how they perceive their charcoal sector, what they determine to be the most appropriate strategies, and whether such policies are aligned with and lead to an enabling policy environment.

This publication presents the key findings from a preliminary assessment of the policies of 31 African countries relevant to charcoal value chains, including production, transport, trade and consumption. The main objective of the study is to assess the extent to which national policies and strategies have the potential to provide a conducive environment for sustainability interventions in the charcoal sector.

This study was conducted in response to a request by the African Forestry and Wildlife Commission (AFWC) for FAO to support the compilation and analysis of sustainable charcoal production in Africa and the formulation and implementation of national charcoal strategies. FAO is pleased to deliver

on that request as part of our broader commitment to Member Nations for better production, better nutrition, a better environment and a better life, leaving no one behind.

Abebe Haile-Gabriel

Assistant Director-General and Regional Representative for Africa
Food and Agriculture Organization of the United Nations

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This work was commissioned by FAO under the overall coordination and supervision of Xia Zuzhang, Forestry Officer (wood energy). Nora Berrahmouni and Soalandy Rakotondramanga, FAO Regional Office for Africa, provided guidance and facilitated the process with the Technical Cooperation Programme.

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Abbreviations and acronyms

AFR100	African Forest Landscape Restoration Initiative
AFWC	Africa Forest and Wildlife Commission
AUDA-NEPAD	African Union Development Agency - New Partnership for Africa's Development
BEST	Biomass Energy Strategy
CO_2	carbon dioxide
FAO	Food and Agriculture Organization of the United Nations
ha	hectare
GLM	generalized linear model
IEA	International Energy Agency
NGO	non-governmental organization
REDD+	Reduce Emissions from Deforestation and Forest Degradation
REST	Renewable Energy Strategy
SDG	Sustainable Development Goal

Executive summary

Charcoal is the main cooking energy source used by urban households and restaurants in sub-Saharan Africa, and its production has been predicted to increase annually at a rate of approximately 3 percent for the next 30 years (UNEP, 2019). Environmental, social and economic concerns shroud the charcoal sector, making it a complex and contentious area to address adequately through national policies. While the overarching goal of most African nations is to effectively wean themselves off charcoal dependency, the majority of them still struggle to manage and monitor the sector effectively. Across countries, numerous policies, strategies and programmes are currently in place to address the charcoal sector. Given the intersectoral nature of charcoal, and the numerous actors involved at all stages of its production, transport and trade, it is important that policies are comprehensive and that they approach the sector systemically and holistically

It is often argued that the success of initiatives in any economic sector is facilitated by having a "conducive policy environment" that creates favourable conditions for implementing a range of profit and non-profit endeavours. However, in many African countries, actors in the charcoal sector often complain about the policy environment being "unconducive" for the sets of sustainable interventions that they would like to undertake. Unconducive policy environments – which include contradictory or misaligned policies – divert precious time and resources from programmes and projects, making it difficult for them to register long-term success. Such policies can hinder effective approaches to addressing issues of non-sustainability in the sector, including developing national charcoal strategies.

National policies and strategies can be effective indicators of a government's vision for the sector, as well as its plans, its current understanding of a problem or topic, and investments in resolving the problem. Policy and regulatory frameworks also reflect the core values held by governments regarding the topic or issue in question. Sustainability-aligned interventions can ensure that solutions to social, environmental and economic challenges related to charcoal are implemented by a wide range of actors and that there is a shared vision and coordinated process for achieving common goals. Such conducive environments can ensure that charcoal is not just an energy and forestry concern, but rather an opportunity for both private and public actors in multiple sectors to collaborate.

The main objective of this study was to assess the extent to which national energy and environmental policies and strategies in Africa have

the potential to provide enabling conditions for sustainability interventions in the charcoal sector. Enabling conditions are those that provide policy and regulatory frameworks that acknowledge the importance of charcoal for energy and livelihoods, recognize the toll that this fuel source can take on the environment and the difficulties experienced by actors along the value chain, and subsequently provide coherent and pragmatic guidance and support for a wide range of actors to engage in actions that improve conditions for people and the environment.

The study was limited to the 31 countries that have pledged commitment to the African Forest Landscape Restoration Initiative (AFR100), including six of the world's top ten charcoal producers (Nigeria, Ethiopia, the Democratic Republic of the Congo, Ghana, the United Republic of Tanzania, and Madagascar, in order of production). A content analysis of their environment and energy policy documents was undertaken to assess: (i) how charcoal is portrayed; (ii) what types of intervention are proposed; and (iii) who they recognize as legitimate and valuable stakeholders to contribute to the sector. The information obtained was used to assess countries' potential conduciveness, based on 42 criteria.

The study focused on examining the conduciveness of the policy environment of nations based on their existing policy and regulatory frameworks. The report did not examine the effectiveness of nations in implementing their policies and regulations, the progress they have made in implementing policies, or the experience of actors trying to operate within current policy environments (the real experiences of stakeholders on the ground). As such, the study assesses *potential* conduciveness as expressed by sectors at the time of drafting, approving and updating their policies and regulations.

Charcoal systems in Africa often revolve around the nexus between food, energy and water, with strong dependencies occurring particularly between the agricultural and forestry sectors. By understanding countries' perceptions and approaches to charcoal (as expressed in their policy documents), insights can be gained into their abilities to address the synergies and trade-offs between charcoal and other land uses in order to attain sustainable production. Moreover, since a large proportion of charcoal is produced by rural farmers and a wide range of poor actors are involved along the value chain, policy environments that recognize and cater for these groups in addition to industrial producers would make the sector more inclusive.

Ten key findings were identified:

Key finding 1: Despite high dependency on charcoal, most AFR100 countries (more than half) have not developed a robust policy and regulatory framework to explicitly address their charcoal sectors.

Key finding 2: Even when countries provide a regulatory framework for their charcoal sectors, these may not be conducive to sustainability interventions.

Key finding 3: The existence of biomass energy or equivalent strategies does not guarantee the existence of conducive policy environments for charcoal-related interventions. Energy strategies can ignore or de-emphasize charcoal and focus on transitions to other types and sources of fuel such as ethanol and biogas.

Key finding 4: Although countries with strong potential for conduciveness tend to provide more balanced narratives of charcoal in their policy discourses, this is not always the case. Policy documents can portray charcoal in a mostly negative light, but still provide highly favourable conditions for sustainability interventions in the sector.

Key finding 5: Charcoal is almost exclusively perceived as an energy-, environment- and forest-related issue, with little or no consideration of the justice and economic dimensions of charcoal, the financial aspects (other than levies and fees), and the dependencies and interlinkages between charcoal and agriculture (land use and tenure). Moreover, health-related issues (beyond respiratory illnesses) are rarely acknowledged.

Key finding 6: The policies examined tend to recognize the need for interventions along the full value chain and some have suggested transformation of the entire sector; however, producer-end and user-end interventions were the most common, with cookstoves being the most frequently proposed user-end intervention.

Key finding 7: Generally, interventions proposed by policies focus on addressing economic and environmental dimensions of sustainability, with little or no consideration for the human dimensions (such as health, working conditions and quality of life of producers, traders and retailers).

Key finding 8: A strong regulatory framework can be severely undermined by short-term government notices (such as logging, transport or charcoal production bans) that restrict the full execution of otherwise conducive policies and regulations.

Key finding 9: With a few exceptions, policy documents rarely discuss cross-border and international trade of charcoal.

Key finding 10: Most countries do not link the objectives of and aspirations for their charcoal sectors to the achievement of multilateral agreements and goals, such as the Sustainable Development Goals (SDGs) and the AFR100 initiative.

Implications for achieving Agenda 2063 and the SDGs

Transforming the use and production of woodfuels is an important component of progress towards achieving the goals of prosperity and the eradication of poverty outlined by Agenda 2063 of the African Union, as well as of the SDGs. In the near and medium term, many African countries will continue to rely on woodfuel for large segments of their populations. Given population growth, increased urbanization and declining forest cover, being able to sustainably produce these fuels is imperative for growth and to mitigate climate impacts, while still providing energy access for cooking and heating. Evaluating the conduciveness of policy to sustainable interventions can set the stage for reassessing policies as countries try to make progress on the SDGs that affect climate, energy, hunger, poverty and land, as well as the Agenda 2063 goals.

1. Introduction

More than 2.6 billion people – most of whom are in the global south – still rely on wood (or woodfuels) to meet their daily energy requirements for cooking and heating (FAO, 2022). While woodfuels are conceived as a source of renewable energy in several high-income countries such as Germany, Japan and the United States of America, with the potential to contribute to low-carbon energy objectives, in much of the global south they tend to be perceived as a "backward" energy that is incompatible with national visions of modernization and development (Mwampamba *et al.*, 2013; Branch *et al.*, 2022).

In sub-Saharan Africa, charcoal and fuelwood can account for up to 90 percent of the primary energy consumption of some nations (FAO, 2017), with production predicted to increase annually at a rate of approximately 3 percent for the next three decades (to 2050) (Liyama *et al.*, 2014; UNEP, 2019). Consequently, concerns in the region about how to address the woodfuel sector go far beyond those related to its potential role in deforestation, forest degradation and carbon dioxide (CO_2) emissions, or its direct effects on the health of users. Providing alternatives to charcoal that are affordable, sources of local jobs and income, culturally appropriate and reliable are additional criteria for African governments to consider when planning the role of charcoal in their energy portfolios. In this regard, for many African nations, charcoal has been a particularly difficult woodfuel to address in an adequate manner.

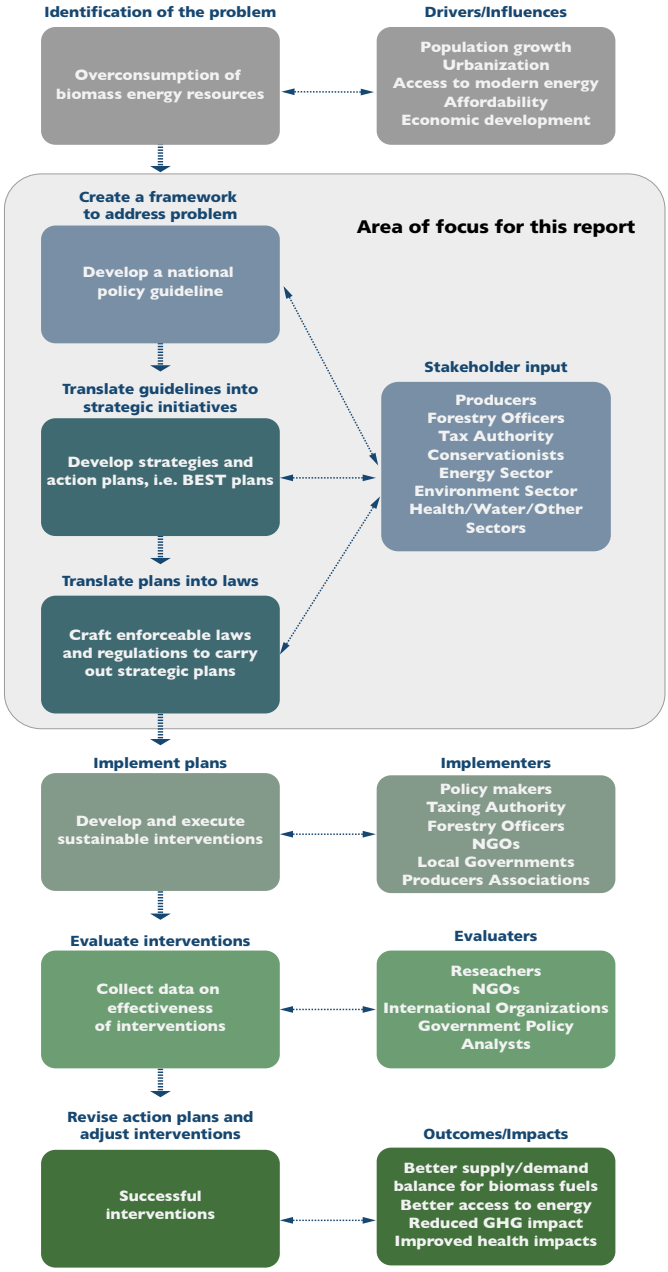
Some frequently mentioned challenges for achieving more sustainable and just charcoal sectors in sub-Saharan Africa include weak governance characterized by local governments that have low capacities and insufficient legal and fiscal empowerment to implement policies and enforce regulations; ample opportunities for corruption; and almost exclusive control of the market by traders (Sander *et al.*, 2011; Neufeldt *et al.*, 2015; Agyei *et al.*, 2020). In specific cases, the sector has been described as being uncoordinated and governed by conflicting policies, many of which ignore the role of charcoal in the forest, energy, land and water sectors (FAO, 2010; Doggart and Meshack, 2017; Sola *et al.*, 2019). It has also been suggested that the preponderance of small-scale informal producers in the value chain contributes to a sector that is dominated by individuals without the skills and powers to advocate and negotiate more just and favourable treatment (Doggart and Meshack 2017; Mabele, 2019). Consequently, governments can be perceived as being "at war" with key actors along the value chain, particularly producers and traders (Mabele, 2019).

Informed by piecemeal studies, anecdotes, alarmist narratives and scanty and usually unreliable secondary data that are rarely adjusted to local contexts, most countries may have to develop their policies based on incomplete information and an only partial understanding of their charcoal sectors (Branch *et al*., 2022). In many cases, the focus of charcoal studies on the forest-impact narrative has historically overshadowed the fact that charcoal is often also a source of affordable and reliable energy that fulfils the needs of many urban households and enterprises (FAO, 2010; Sola *et al*., 2017; FAO, 2017). Such dominant narratives downplay the regional and national-scale nuances of charcoal, over-simplify the complexities of the sector, and can push governments to believe that compelling viable alternatives to charcoal are available and can easily be implemented and scaled up. Consequently, the charcoal sector – which is estimated to be an 8 to 25 billion dollar industry in the region (World Bank 2011; UNEP 2014) – is often subjected to broad-brush policies and short-term interventions such as bans and other types of restrictions on trade, transport or production (Branch *et al*., 2022). However, these restrictions are usually detrimental to consumers, producers and retailers, and limit efforts that attempt to explore national potential to produce charcoal sustainably (such as innovative solutions to the bottlenecks and challenges encountered in the sector) (Mwampamba *et al*., 2013; Ghilardi *et al*., 2013; Doggart and Meshack 2017).

Countries that formulate woodfuel policies which explicitly recognize the economic and social importance of charcoal and those that develop strategies and programmes to enhance the sustainability of charcoal create a policy environment that can facilitate a broad set of actors to contribute to the sector in a positive way (Doggart and Meshack, 2017) (see Figure 1). Conversely, countries that are heavily reliant on charcoal but view it as an undesirable source of energy, or those with misaligned or unclear policies on charcoal, perpetuate a policy environment that makes it very difficult for civil society, non-governmental organizations (NGOs) and the private sector to participate in the sector and contribute innovative solutions to improve sustainability. Consequently, a synthesis of how charcoal is reflected in nations' energy and environmental policies and in their national programmes, strategies and action plans, can provide key insights into how governments view charcoal and its role in their energy portfolios, how they understand their charcoal sector, and what they perceive as the most appropriate strategies for the sector. Obtaining clarity regarding a nation's "stance on charcoal" can also help to identify whether environmental and energy policies are aligned (or misaligned) in their portrayals of charcoal, and which government institutions are responsible for the sector and for identifying and implementing solutions. Understanding nations' positions on charcoal can provide an overarching assessment of the "conduciveness" of the policy environment, which is particularly valuable to national and international actors interested in investing in sustainability

outcomes for the sector by enabling them to plan their interventions according to what is promoted by the existing policy environment.

Figure 1. Generic framework for creating a conducive environment for sustainability interventions



Source: Authors' own compilation.

In response to a request by the African Forestry and Wildlife Commission at its twenty-first session (AFWC-21, held in June 2018 in Senegal), FAO is supporting the African Union Development Agency (AUDA-NEPAD) and member countries in implementing and monitoring the African Forest Landscape Restoration Initiative (AFR100). This initiative is a country-led effort and aims to bring 100 million hectares (ha) of deforested and degraded land into restoration by 2030. Under the leadership of the AFR100 Secretariat hosted by AUDA-NEPAD, the initiative connects political partners with technical and financial support to scale up restoration on the ground. By the end of 2021, 31 African countries had committed to restoring 128 million ha of forests and landscapes. Technical support is therefore urgently needed to enable countries to translate these ambitious commitments into implementation on the ground. One of the main intervention areas is creating an enabling environment for the conservation, sustainable management and restoration of forest landscapes, aimed at addressing drivers of deforestation and forest degradation and biodiversity loss due to agricultural expansion, excessive exploitation of resources such as fuelwood and overgrazing, while building resilience and supporting trade-offs and sustainable livelihoods.

The twenty-second session of the African Forestry and Wildlife Commission (AFWC-22, held in March 2020 in South Africa) requested FAO to support the compilation, analysis and dissemination of good practices for sustainable charcoal production, as well as the adoption of alternative sources of energy. It also recommended that FAO support countries in the formulation and implementation of national charcoal strategies. AFWC-22 urged FAO to produce, in collaboration with countries and regional organizations, a regional forest outlook study for sustainable development in Africa, identifying trends and opportunities for the development of wood and non-wood forest products, as well as ecosystem services.

Against this background, FAO commissioned The Charcoal Project and a team of researchers to investigate the charcoal policies and strategies of African countries and to evaluate whether such policies and strategies are conducive for actors (national and international, private and civil, government and non-government) to invest with confidence in the sector, and to identify policy gaps and propose recommendations for interventions in order to enhance sustainable pathways in the sector and achieve AFR100 objectives in the long term.

Defining a "conducive environment" for sustainability interventions in the charcoal sector

With the exception of a few authors, most of the literature that discusses sustainable charcoal systems assumes that there is a shared understanding of "sustainable charcoal", a "sustainable charcoal sector or system', and the key elements for an "enabling policy" that would create the right conditions for "sustainable pathways" to prosper.

Doggart and Meshack (2017) provide one of the few explicit and clear descriptions available in the charcoal literature, describing their notion of a sustainable charcoal sector as one whereby

"… a charcoal market [would be] supplying charcoal from sustainably managed, community- and privately-owned woodlands to urban households. Tax revenues would continue to be retained at village and district level in order to incentivize and finance sustainable management of natural woodlands. The professionalism and organization of charcoal producers would increase with concomitant environmental benefits in terms of compliance with efficiency and sustainability guidelines, as well as improved livelihoods for producers, and other rural development gains" (p. 11).

For this to happen, they recognize that multiple policies (forestry, energy, land, water and agriculture) need to be revised so as to explicitly incorporate objectives and statements that support sustainable charcoal production and use, and more specifically, that alignment is needed between forestry, energy and agricultural policies.

FAO's (2010) list of principles, criteria and indicators for sustainable charcoal production calls for a sustainability vision that is spearheaded by energy and forestry agencies that focus on:

- *the establishment of forest management programmes to avoid forest degradation and deforestation through overharvesting for charcoal production;*
- *the formalization and regulation of the charcoal industry;*
- *providing charcoal makers with a range of suitable technologies that best suit local conditions (rather than a single "best" technology);*
- *the promotion, through pricing and appropriate policies, of charcoal from residues and plantation timber;*
- *investment in improved charcoal-production technology; and*
- *the training of forest planners, extension agents and charcoal makers* (pp. 75–76).

Focusing more on the institutional and governance shortcomings of existing charcoal policies in four sub-Saharan countries, Sola *et al.* (2019) conclude that a "*more integrated woodfuel governance that considers local context, informal markets and decentralised government entities is required to attain more sustainable woodfuel value chains…*" (p. 38). Numerous works describe and propose specific interventions that can be undertaken to ensure sustainability along the value chain (see Table 1). In this report, these proposed actions are referred to as "sustainability interventions".

Table 1. Examples of sustainability interventions for improving the charcoal sector

INTERVENTION TYPE	EXAMPLE	STAGE IN THE VALUE CHAIN	SOURCE
Technical	Sustainable tree production and management, including promoting on-farm trees, woodlots, tree plantations, and management of natural forests.	Feedstock supply	Odour, 2012; Njenga *et al.*, 2013; Neufeldt *et al.*, 2015; FAO, 2017.
	Encouraging development of woodlots and tree plantations for biomass energy.	Feedstock supply	Odour, 2012, Njenga *et al.*, 2013; Neufeldt *et al.*, 2015; FAO, 2017.
	Wood handling and treatment before carbonization (e.g. encouraging drying wood before carbonization).	Carbonization	Odour, 2012; FAO, 2017.
	Improving efficiency of kilns, stoves and other end-use devices.	Carbonization and end-use	Odour, 2012; Njenga *et al.*, 2013; FAO 2017.
Governance & institutions	Facilitating communities to establish their own forest reserves and manage forests sustainably for charcoal, including establishing charcoal user groups, associations of charcoal traders etc.	Feedstock supply	Doggart & Meshack, 2017.
	Policy reform to shift sector towards sustainability pathways.	Sector-wide	Njenga *et al.*, 2013; Neufeldt *et al.*, 2015; FAO, 2017.
	Developing mechanisms to facilitate smooth administration of the sector, including addressing barriers to legal participation in the charcoal sector.	Sector-wide	Doggart & Meshack, 2017.
	Addressing corruption and injustices along the value chain.	Sector-wide	Neufeldt *et al.*, 2015.
	Encouraging collaborative action among actors, including intersectoral coordination.	Sector-wide	Odour, 2012; Doggart & Meshack, 2017.
Juridical (legal) & issues of justice	Improving land and biomass tenure to facilitate legal access and ownership of biomass for bioenergy.	Feedstock supply	Doggart & Meshack, 2017;
	Facilitating the application of existing laws and regulations governing the charcoal sector, including transportation and trade.	Sector-wide	Neufeldt *et al.*, 2015; FAO, 2017.
	Addressing injustices (procedural, distributional and recognition injustices) along the value chain.	Sector-wide	Mabele, 2019.

INTERVENTION TYPE	EXAMPLE	STAGE IN THE VALUE CHAIN	SOURCE
Education, research & development	Development of marketing strategies to promote use of sustainable charcoal.	Trade and user-end, also sector-wide	Odour, 2012.
	Exploring and developing appropriate technologies for producing and using charcoal sustainably.	Carbonization,	Odour, 2012; FAO, 2017.
	Training foresters in sustainable management of natural forests for charcoal.	Feedstock supply	Doggart & Meshack, 2017.
	Development of techniques and standards to assess the impact of charcoal production and use.	Sector-wide	Musule *et al.*, 2021.
	Facilitation of knowledge sharing	Sector-wide	Neufeldt *et al.*, 2015.
	Promoting more positive images of charcoal and educating in the concept of "sustainably produced charcoal", including advocacy and lobbying for change at national level.	Policy level	Neufeldt *et al.*, 2015 ; Doggart & Meshack, 2017.
Financial	Investments in co-generation technologies to jointly produce charcoal and electricity (where appropriate).	Carbonization	FAO, 2017.
	Provision of loans for private woodlot investors in trees for biomass production.	Feedstock supply	FAO, 2017.
	Finance for research, education and human resource development for sustainability interventions.	Sector-wide	FAO, 2017.
	Financing process for developing policies, strategies and action plans for the sector.	Policy level	FAO, 2017.
	Investment in process of enabling communities to own forests and woodlots.	Feedstock supply	Doggart & Meshack, 2017.
	Marketing sustainable charcoal, efficient and clean cookstoves and viable alternatives (that are charcoal-like).	Trade & transport	Mwampamba *et al.*, 2013a.
Charcoal-like alternatives	Using charcoal dust and sawmill and agricultural residues to produce briquettes.	Parallel alternative sector	FAO, 2017.
	Encouraging and enabling briquette enterprises to prosper.	Parallel alternative sector	Mwampamba *et al.*, 2013b.
	Promoting use of sustainably sourced briquettes.	Parallel alternative sector	FAO, 2017.

Source: Authors' own compilation.

In essence, a nation's stance or vision of the charcoal sector is reflected in a broad set of government documents that set the policy and legal framework

for charcoal sector operators. Given that the ideals and visions contained in policies are operationalized through sector-specific strategies, action plans, laws and regulations, the content of such documents – to a large extent – sets the stage for what can ultimately become significant barriers or facilitators for entry and effective participation in the sector by well-intentioned participants. There are many other potential barriers to creating a sustainable charcoal sector, such as the availability of sufficient human, financial and information resources in government to effectively implement existing policies (Sola *et al.*, 2019; Schure *et al.*, 2013); such barriers (and many others) were not examined in this study.

This study focused solely on the intentions of countries for their charcoal sector, as expressed in formal policy documents. These documents describe what is formally possible in a country, given the regulatory framework. For policies to work, they need to be adequately implemented and the interventions they propose need to be effective. Implementation and intervention success were not, however, addressed in this study, as that would have required a very different methodological approach, including fieldwork and a survey of actors. Ideally, these questions will be pursued in future studies, identifying best practices for the sector so as to link what works well with how governments facilitate such actors by providing conducive policy, regulatory and financing frameworks.

1.1. RESEARCH QUESTIONS

The main research question guiding the policy and strategy review and analysis was: How are charcoal and the charcoal sector portrayed in existing government policies of African countries and what strategies and interventions are proposed for the sector?

The specific questions were:

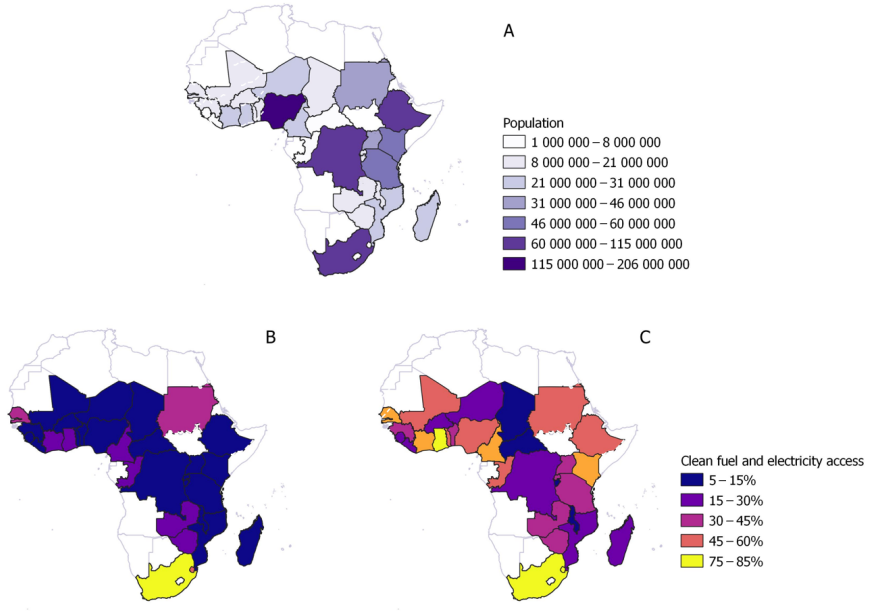
- How is charcoal portrayed in environmental and energy policies? (Positively? Negatively? Neutral?)
- How does portrayal differ across policies? In other words, are policies related to charcoal aligned or contradictory? Which policies are aligned, and which are not?
- What are the range of strategies and interventions that are proposed by existing policies for the charcoal sector? Is there a preference for certain types of intervention over others? Is there a tendency to focus on some parts of the supply chain over others? What patterns emerge? How are these related/contributing to nationally determined contribution implementation/AFR100 objectives in these countries?
- Given the strategies proposed, would "typical" interventions in the charcoal sector find a conducive environment? How so?
- Is "conduciveness" (or unconduciveness) of policies correlated to other

charcoal-related attributes of nations, such as the amount of charcoal consumed or produced; rates of forest loss; total forest area? How are proposed strategies correlated to these same attributes?

By answering these questions for the AFR100 nations (see Figures 2 and 3) it is possible to appreciate how countries vary in terms of how much effort they have invested in conceptualizing and planning their charcoal sectors. It is also possible to test whether assumptions about the sector that have tended to dominate the charcoal literature and discourse are upheld, such as whether a dominance of negative portrayals of charcoal contributes to highly prohibitive policies on charcoal production and trade (Mwampamba *et al.*, 2013; Sola *et al.*, 2019).

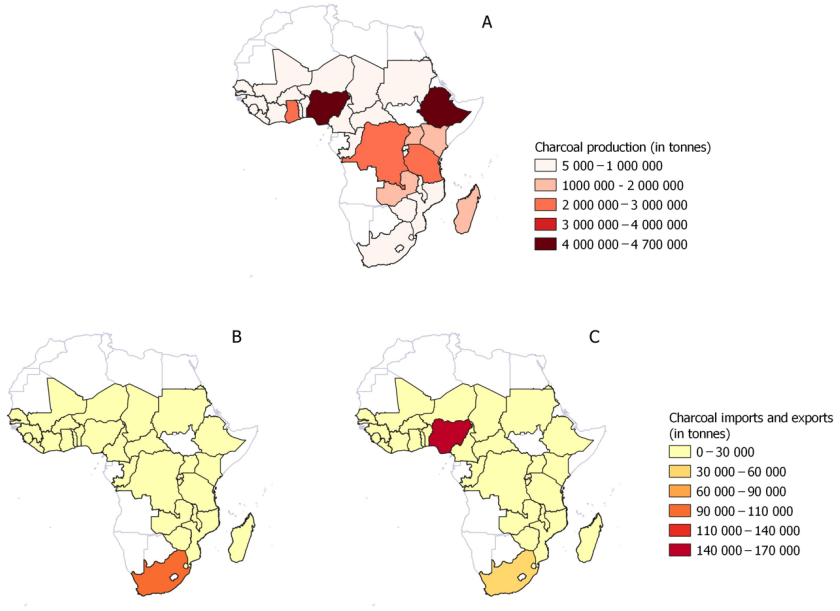
The 31 AFR100 countries are highly disparate in terms of population size, population with access to electricity, volume of charcoal produced and forest cover (see Figures 2 and 3). They are, however, quite similar in terms of proportion of total population with access to clean cooking fuels (including liquefied petroleum gas). Almost all countries participate in some cross-border trade (export and import), and while these figures are not entirely reliable and updated, they do indicate that – for the most part – countries consume a large proportion of what they produce (see Figures 3B and 3C).

Figure 2. Information on population and energy access for the 31 African countries studied



Sources: Worldometer – Our World in Data. (A) Countries in Africa by population. Cited 25 January 2023. www.worldometers.info/population/countries-in-africa-by-population/
(B) Ritchie, H., Roser, M. & Rosado, P. 2022. Proportion of population with access to clean cooking fuel. https://ourworldindata.org/energy
(C) Ritchie, H., Roser, M. & Rosado, P. 2022. Proportion of population with electricity access. https://ourworldindata.org/energy
Notes: Final boundary between the Sudan and South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.

Figure 3. Information on the charcoal sector characteristics of the 31 African countries studied



Source: Food and agriculture data (FAOSTAT). Cited 25 January 2023. http://www.fao.org/faostat/en/#home20

Notes: (A) Annual charcoal consumption was calculated using FAOSTAT data: volume of charcoal consumption = volume of charcoal domestic production - volume of exports + volume of imports, (B) amount of charcoal imported, and (C) amount of charcoal exported.

The study consisted of a review of national policies and other policy-relevant documents that are currently in effect and pertinent to charcoal. As such, in addition to policies, the acts and regulations, strategies, action plans and programmes have also been reviewed. These sets of documents set the tone for how charcoal is perceived by the government in its different sectors, and it provides guidance for the kinds of charcoal-related activities that can be undertaken in a country, including the regulatory framework surrounding those activities. Together, they determine the policy environment within which sustainability interventions in the charcoal sector must operate. Note that these documents do not provide an indication of how actors in the sector experience the operationalization of such policies. Common complaints from actors, which include high rents, inefficiencies and excessive levels of bureaucracy to obtain permits, long durations and inconsistencies in how rules are applied, cannot be determined by examining policies. These require another type of study in which actors' experiences are captured and described and clarity is gained on the barriers to entry and to staying in the formal charcoal sector. A follow-up study to this report would examine the effectiveness of interventions enacted under conducive policy environments.

1.2. KEY CONCEPTS

The "policy environment" is conceptualized as the general market and practical operational conditions that governments provide to facilitate or impede activities. Policies (and their associated regulations, laws, guidelines and strategies etc.) determine how easy or difficult it would be for stakeholders to engage with the charcoal sector to achieve sustainability outcomes along the charcoal supply chain and market. A favourable policy environment provides conditions that are conducive to interventions in the sector that lead to sustainable outcomes. In other words, they generate an enabling environment for charcoal interventions. The policy environment around an issue is also sometimes referred to as the regulatory framework overseeing the sector.

The study focuses on the conduciveness of forestry, environmental and energy policies, and strategies to advance sustainability and AFR100 objectives. Environmental policies are broadly defined as policies that are concerned with the state, use and conservation of forests/woodlands/natural resources; trees and farms (agriculture); climate change, biodiversity conservation and sustainable use; and the environment more generally. Energy policies are broadly defined as those policies concerned with energy security, energy access for all, cleanliness, and renewability of energy sources.

This report also considered policy documents that ultimately inform policy developments, those that guide the actual implementation of policies and those that outline the regulatory framework for charcoal-related activities, such as national development plans, strategies, laws, regulations, programmes, memoranda, executive orders, and other similar documents. In the report, all these documents are broadly referred to as "policies".

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2. Methodological approach

The study was based on content analysis of the full text of policy and policy-relevant documents. Most of the documents to be reviewed were acquired directly from government websites and via a general search on the Internet of relevant terms using the Google search engine. In a few cases, documents were provided by AFR100 national focal points. The title and content of documents were reviewed to determine their relevance. Only government authored documents were considered and only those that were either in force during the study period (2021) or – in the case of biomass energy strategies and some policies – as draft text that had been commissioned by governments and which was under review. Documents reviewed were in English, French and Portuguese. Using the Dedoose® web-based application, the full texts of documents were reviewed, and a list of codes was applied to text that provided relevant information for the study questions. Codes were developed to capture information about whether a document referred to charcoal and/or the charcoal sector, and if so: how it portrayed charcoal and the sector; what interventions it proposed for the sector; and who it deemed as the relevant actors for the charcoal sector.

A mixed-methods approach was used to analyse code application and to associate this with country characteristics. As such, frequency counts of keywords and word clouds were generated to determine the extent to which charcoal is explicitly recognized and acknowledged by policies. Also, lists of words used in documents to describe charcoal were compared across countries and sectors to assess its relevance and interpret the dominant charcoal narratives that were promoted in policies. The overall conduciveness of a country's policies was determined by the overall score across 42 true/false questions addressing five components of conduciveness (see the Annex for a more extended version of the methodological approach). These were:

- **Charcoal mentions**: establishes if policies discuss charcoal directly, recognize it as an energy source that is distinct from other biomass energies such as fuelwood or liquid biofuels;
- **The regulatory framework**: establishes if governments provide a clear and non-conflictual set of policies and policy instruments, including strategies, laws and regulations, action plans and guidance for stakeholders;
- **Portrayals of charcoal:** establishes if policies provide balanced and even favourable narratives of charcoal, charcoal producers and consumers and acknowledge its importance to energy security, livelihoods and economies;

- **Interventions**: establishes if policies propose interventions that address the full value chain and that match the challenges identified as linked to the charcoal sector; and
- **Roles and responsibilities**: establishes if policies recognize the multisectoral nature of charcoal and acknowledge a diverse range of stakeholders as having roles and responsibilities and as being key to achieving multiple sustainability objectives.

Finally, multivariate analysis was used to determine which attributes of countries best explains their conduciveness score.

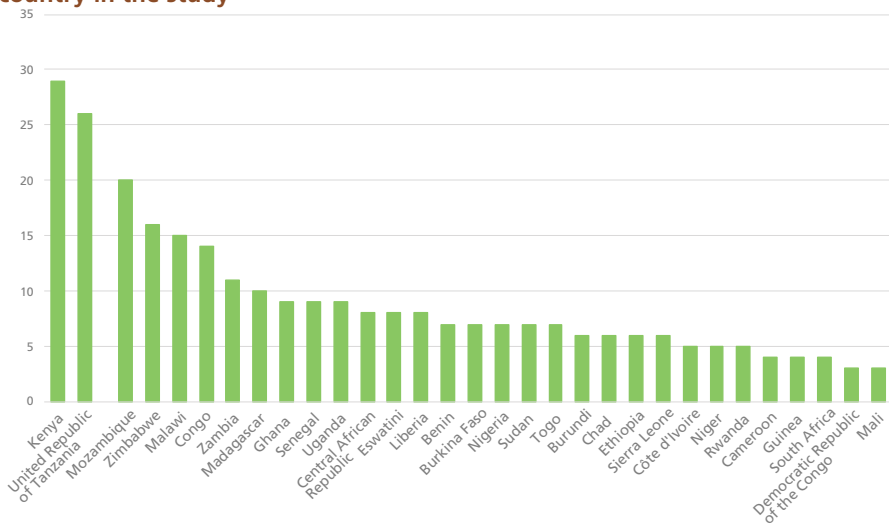
3. Results and discussion

3.1. GENERAL RESULTS

A total of 364 documents were collected, but only 284 were deemed relevant for the study.[1] Documents were excluded for being reports rather than policy documents, or for not being the most recent updates of policies. Relevant documents were subsequently reviewed and their content analysed to respond to the research questions. Documents were disproportionately distributed across countries. For example, Kenya, the United Republic of Tanzania and Mozambique were the only countries that contributed 20 or more relevant documents to the final corpus of reviewed policy documents; most countries contributed between four and ten documents (see Figure 4). Ease of document acquisition was highly dependent on how well government websites were organized, and whether full-text documents were available online, either on the website or through additional document searches. Documents for Guinea, Mali, Rwanda, the Democratic Republic of the Congo and the Sudan were the most difficult to acquire; results for these countries should be interpreted with this in mind. Direct requests were made to African Forestry and Wildlife Commission points of contact for the AFR100 countries, to determine if key documents were missing.

[1] Of the 364 initially collected, 80 were deemed to be reports or other documents, which while pertinent to the sector, were not actual policy documents.

Figure 4. Number of policy documents identified and assessed for each country in the study

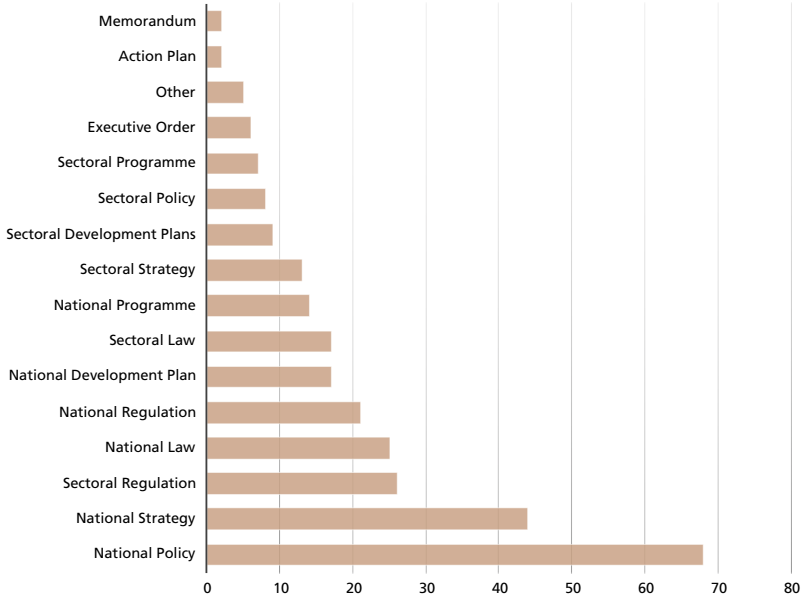


Source: Authors' own compilation.

Types of documents reviewed

Sixteen categories of document were reviewed (see Figure 5). Most of the documents reviewed consisted of national policies, strategies, laws and sectoral regulations.

Figure 5. Distribution of documents according to document types that were analysed (N=284)

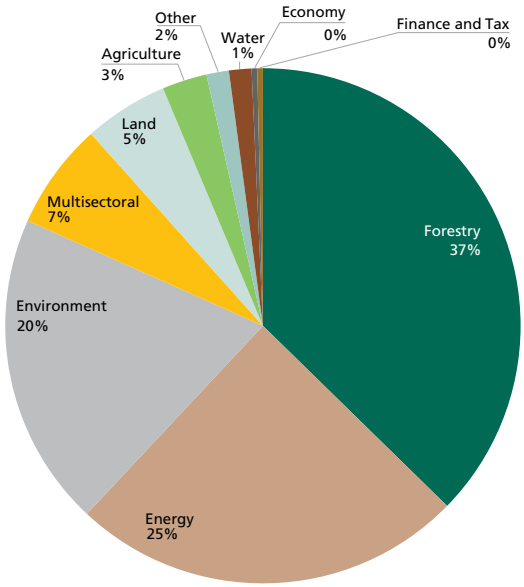


Source: Author's own compilation.

Most of the documents reviewed were published by the Forestry sectors of governments (106), followed by the Energy (70) and Environment (56) sectors (see Figure 6). Environment sector documents included conservation- and climate change-related policies and strategies. Only 19 of the 284 documents were developed by multisectoral or cross-ministerial collaborations. Importantly, some documents were published by the Land, Agriculture and Water sectors and presented an opportunity to assess the extent to which these sectors link themselves to charcoal, and how they discuss and perceive the charcoal sector, given their sectoral objectives.

Documents released by ministries in charge of national economies and their fiscal branches are notably absent from the set of policy documents that were reviewed. This is in part because this review focuses on environmental and energy policies. However, a broad search was conducted to identify all policy documents that address natural resources, the environment and energy. So while this study primarily looked for documents in the Energy, Environment and Forestry sectors, the searches brought forth some documents in other sectors, which were included in the analysis. The low incidence of the economic sector addressing a product that contributes millions of dollars to national economies, and which provides employment to millions of people along its supply chain, is indicative of the lack of a clear economically motivated strategy to address the trade and labour dimensions of charcoal.

Figure 6. Distribution of policy documents across sectors



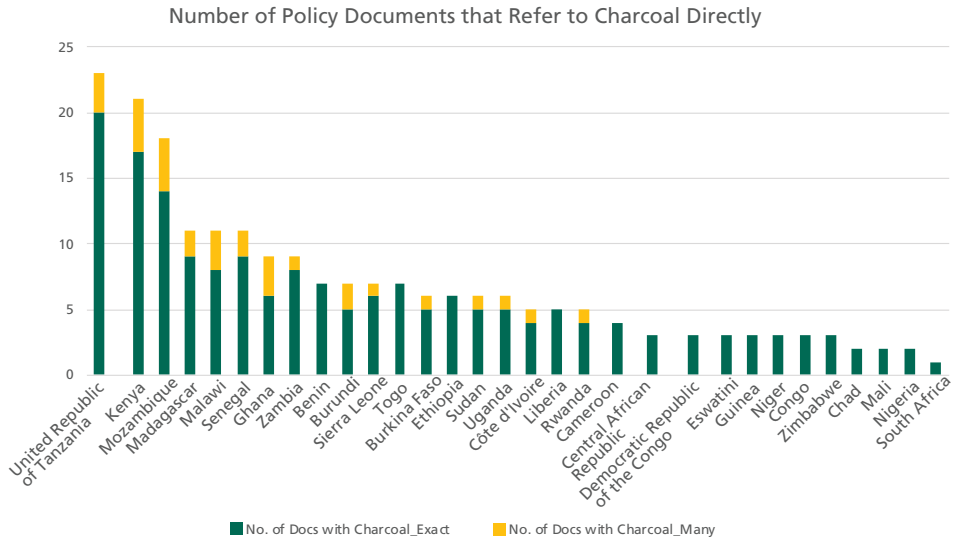
Source: Authors' own compilation.
Note: Sectors were identified based on the authorship of the document. They usually consisted of government ministries and their agencies.

3.2. CHARCOAL MENTIONS

While, in some cases, it can be useful to recognize the similarities between charcoal, firewood or fuelwood and other solid biomass fuels (such as pellets, briquettes) and to sum them up into all-encompassing terms such as "woodfuels", "fuelwood", "solid biomass energy" or "bioenergy", it is now well-established and widely accepted that consistent conflation of charcoal with firewood and other solid biomass fuels can lead to the development of suboptimal strategies for addressing the specificities that each fuel type requires (Mwampamba *et al.*, 2013).

Among the 284 policy documents that were reviewed, 182 documents used the exact word "charcoal" (or its Portuguese and French equivalent) at least one time (see Figure 7). However, only 30 of these documents applied the term more than 20 times (see yellow section of bars in Figure 7), suggesting that most of the documents reviewed were not specifically about charcoal, or that they addressed charcoal indirectly, using alternative terms or synonyms. A term was only considered a synonym if it could be determined that it was directly replacing the term "charcoal", or if it was used interchangeably with "charcoal", or if the way in which the term was defined in the glossary enabled an inference to be made of charcoal. A number of documents provided definitions of those terms at the beginning of the text in the form of a glossary. These definitions were often the only direct reference to charcoal made in the entire document.

Figure 7. Direct use of the term "charcoal" in policy documents per country



Source: Authors' own compilation.

Notes: Includes the number of policy documents that used the exact term "charcoal" more than 20 times (i.e. Charcoal_Many). Policy documents that refer to charcoal many times indicate that they are highly relevant for the charcoal sector.

Highly relevant policy documents for the charcoal sector

A closer exploration of the 30 documents that mention charcoal explicitly, and do so many times, reveals that these are principally National Biomass Energy Strategies (BESTs) or their equivalent. For example, the study reviewed a total of 29 Kenyan policy documents, but only 17 of these used the exact term "charcoal" and of these, only four used "charcoal" more than 20 times. In the case of the United Republic of Tanzania, the study reviewed a total of 26 documents, of which 20 explicitly refer to "charcoal", but only three of these use the term "charcoal" more than 20 times.

Table 2 lists the titles of the 30 documents that repeatedly used the term "charcoal", along with the government body that authored the document. Many of these documents are National Strategies for Climate Change, Conservation, Forests and Energy. For some countries, more specific and elaborate policies relevant to the charcoal sector were in the form of programmes or schemes. This was the case, for example, for countries such as Madagascar and Senegal, whose documents repeatedly mentioned the term "charcoal". In the case of Madagascar, in 2019 the country adopted a Regional Wood Energy Supply Scheme for the Analamanga Region, which deals in depth with issues relating to wood energy, including charcoal [Schéma Régional d'Approvisionnement en Bois Energie-Région Analamanga 2019, République de Madagascar].

Biomass Energy Strategies (BESTs) were considered equivalent to Renewable Energy Strategies (RESTs), but not equivalent to Sustainable Energy for All (SE4ALL) strategies, which tend to address energy needs beyond those for cooking. On closer examination (see section 3.4 Interventions), several BESTs and RESTs focused mostly on transitioning to biofuels and rarely discussed charcoal (for example, Ghana's BEST). Malawi was the only country to have a charcoal-specific national strategy.

Table 2. List of the 30 documents that mention charcoal more than 20 times

Country	Official title of policy document	Government body responsible for the document
Burkina Faso	Burkina Faso Urban Household Energy Strategy	Government of Burkina Faso
Burundi	Development of the sectoral strategy for the energy sector in Burundi	Ministry of Energy and Mines
	National strategy and action plan on climate change	Ministry Of Water, Environment, Land Use and Urban Planning
Côte d'Ivoire	National Renewable Energy Action Plan (PANER)*	Ministry of Petroleum and Energy
Ghana	Strategic National Energy Plan	Energy Commission Ghana
	Bioenergy Policy for Ghana [DRAFT]	Energy Commission Ghana

Country	Official title of policy document	Government body responsible for the document
	Ghana Renewable Energy Master Plan*	Energy Commission Ghana
Kenya	Forest (Charcoal) Rules	Ministry of Environment and Natural Resources, Kenya Forest Service
	National Forest Programme	Ministry of Environment and Natural Resources
	Bioenergy Strategy 2020-2027*	Ministry of Energy
	Kenya Strategic Investment Framework for Sustainable Land Management	Ministry of Environment and Natural Resources
Madagascar	Support mission for the review of the National Wood Energy Supply Strategy Project	Ministry of Environment, Ecology, Sea and Forests
	National Wood Energy Supply Strategy (SNABE)*	Ministry of Energy and Hydrocarbons and Ministry of Environment, Ecology, and Forests
Malawi	National Charcoal Strategy*	Ministry of Natural Resources, Energy and Mining
	National Energy Policy	Ministry of Natural Resources, Energy and Mining
	Malawi Renewable Energy Strategy*	Ministry of Natural Resources, Energy and Mining
Mozambique	Biomass Energy Strategy for Mozambique*	Ministry of Energy
	Strategy for the Conservation and Sustainable Use of Biomass Energy for the Period 2014-2025	Ministry of Energy
	National REDD+ Strategy Action Plan	Ministry of Energy
	Strategic Agenda 2019-2035 and National Forest Program Mozambique	Ministry for Coordination of Environmental Action
Rwanda	Biomass Energy Strategy - Volumes 1 & 2 (2009)*	Ministry of Infrastructure
Senegal	Sustainable Energy for All (SE4ALL) Programme Senegal National Action Program period (2015-2020-2030) as part of the implementation of the ECOWAS Renewable Energy Policy (PERC)	Ministry of Energy and Renewable Energies Development
	National Renewable Energy Action Plan (PANER) Senegal Period [2015-2020/2030]*	Ministry of Energy and Renewable Energies Development
Sierra Leone	National Renewable Energy Action Plan (NREAP)*	Ministry of Energy and Water Resources
Sudan	National REDD+ Strategy and Action Plan	Ministry of Agriculture and Natural Resources
United Republic of Tanzania	Tanzania Biomass Energy Strategy and Action Plan [DRAFT]*	Ministry of Energy and Minerals

Country	Official title of policy document	Government body responsible for the document
	Forestry and Value Chains Development (FORVAC)	Ministry of Natural Resources and Tourism
	The Forest (Sustainable Utilization of Logs, Timber, Withies, Poles or Charcoal) Regulations	Ministry of Natural Resources and Tourism
Uganda	Biomass Energy Strategy (Uganda) [DRAFT]*	Ministry of Energy and Mineral Development
Zambia	Zambia National Strategy to Reduce Emissions from Deforestation and Forest Degradation (REDD+)	Forestry Department, Ministry of Lands, Natural Resources, and Environmental Protection

Source: Authors' own compilation.
*Biomass Energy Strategies (BESTs) or Renewable Energy Strategies (RESTs).
Note: Nigeria's Regulations on Charcoal Production and Export, and Ethiopia's DRAFT Biomass Energy Strategy were not captured in Phase 1 of the project and not included in this list. For Rwanda, Volume 1 is an executive summary, Volume 2 was coded.

Eleven of the 30 documents are BESTs, three of which are in draft format, meaning that they are not yet being enforced. Some documents have been under review since 2009 (such as Uganda's BEST). BESTs usually need to be accompanied by action plans and regulations and there needs to be clarity on the institutional responsibilities for implementing them effectively.

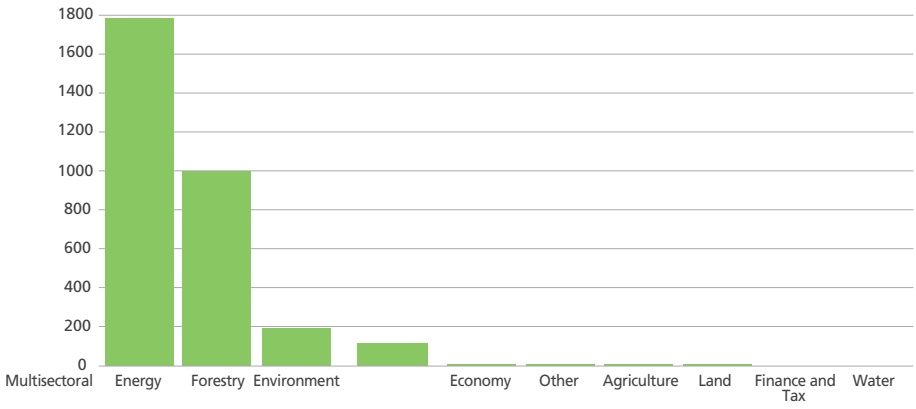
Explicit references to charcoal

Documents from the energy and forestry sectors were more likely to mention charcoal by its name (charcoal_exact) rather than by a synonym, and to refer to charcoal frequently (charcoal_many). Even though the forestry sectors of countries contributed the most documents to the corpus (see Figure 6), energy documents used the exact term "charcoal" almost twice as much as the forestry sector (see Figure 8). This is not surprising, given that BESTs tend to be "the document" in which to discuss charcoal and are usually authored by the ministries responsible for the energy sector.

The fact that the energy and forestry sectors are the most prominent in explicitly addressing charcoal is closely linked to the inherent nature of charcoal: it is a natural resource from forests, and it provides energy. The gaping absence of charcoal mentions in Water, Land, Agriculture, Labour, Health and Finance policy documents is an indication that governments perceived charcoal as – predominantly – an environmental and energy issue. However, the charcoal sector is increasingly being recognized as a nexus topic, where land, forests, energy, health and food sectors are interlinked (Mwampamba *et al*., 2020a; Ghilardi *et al*., 2013; Liyama *et al*., 2017). Moreover, multiple transversal themes such as health and safety, justice and equality, and labour and markets are key social factors that influence and characterize the sector (Branch *et al*., 2022).

Working with a multiplicity of actors can, in some cases, lead to governance challenges, especially when policies are misaligned (Owen *et al*., 2013; Neufeldt *et al*., 2015). The alternative, however, is the continuation of silo-based approaches for dealing with the sector, and their effectiveness over the past 40 years is now being vigorously questioned (Mwampamba *et al*., 2020; Branch *et al*., 2022).

Figure 8. Number of times "charcoal" appears exactly in policy documents by sector



Source: Authors' own compilation.

The common use of synonyms

A little over one-third (36 percent) of the policy documents refer to charcoal by using synonyms and alternative terminologies. Thus, documents that could be highly relevant for the charcoal sector (such as the Forest Act) may mention charcoal only once and refer to it the rest of the time with an alternative term that is defined in the glossary.

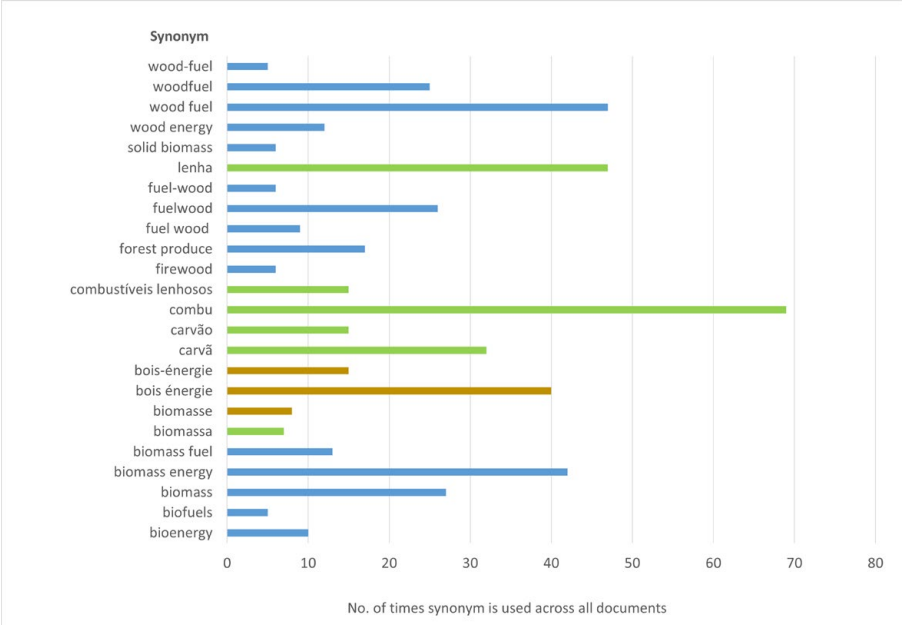
Sixty-four (64) different terms were used across the documents as alternatives for the term "charcoal" or its French and Portuguese equivalents (see Figure 9). Only terms repeated five times or more were considered. A "synonym" was considered any word or combination of words that was used to describe charcoal implicitly or explicitly.

The most frequently used synonym in English language documents was "woodfuel" and its numerous spelling versions (such as wood-fuel, wood fuel, and woodfuels), followed by biomass energy (in English) and *bois l'énergie* (in French) (see Figure 9). "Combu" was used repeatedly in documents from Mozambique "Wood energy" was also commonly used interchangeably with "charcoal".

The use of "fuelwood" was also common, and had to be carefully assessed to ensure that its use was not limited to firewood. According to The Unified Wood Energy Terminology (FAO, 2001), "fuelwood" refers to "wood in the rough (from trunks, and branches of trees) to be used as fuel for purposes such as cooking, heating, or power production". While it does not refer to charcoal *per se*, it is used to refer to the raw logs and branches that are harvested and prepared for carbonization. In Mozambican documents, this was referred to as "combu". "Woodfuel", on the other hand, encompasses "all kinds of energy material from wood", which includes charcoal *and* firewood. Because firewood is an unprocessed form of wood energy, it is both a woodfuel and a fuelwood. However, charcoal (the carbonized wood) is *only* a woodfuel. Thus, the phrase "fuelwood and charcoal" refers both to the unprocessed logs and branches intended for charcoal production *and* the carbonized product, charcoal. It was not always clear, however, whether policy documents were aware of the subtleties in the differences between these terms and if they were correctly applied consistently.

The use of different terms is not – strictly speaking – problematic, if within a country and across policy documents there is common understanding and consensus on what the terms mean. However, if within and across sectors the use of terms is inconsistent, this can make cross-sectoral collaboration challenging. However, given the confusion of definitions, the tendency to defer to synonyms and alternative terms in policy documents rather than to mention charcoal explicitly could be interpreted as an unwillingness to address the charcoal sector directly. Because terms such as "woodfuel", "biomass energy", "bioenergy" and "biofuel" can also refer to pellets, briquettes, ethanol and biogas, charcoal runs the risk of being addressed together with either unprocessed fuel (such as firewood) or highly processed fuels (such as biodiesel). Policy documents that try to address all these fuel types under a single regulatory framework are unlikely to be effective in dealing with each fuel type without some specificity.

Figure 9. Frequency of use of the most common terms for charcoal across all documents



Source: Authors' own compilation.
Note: Blue bars = English, Green = Portuguese, Brown = French. Only terms that appeared five or more times are included.

3.3. CHARCOAL PORTRAYAL: THE CHARCOAL NARRATIVES OF NATIONS

A total of 2 762 excerpts contributed relevant information to assess how charcoal is discussed and portrayed in policy documents. Charcoal can be recognized as an important source of energy for a country or as an environmental threat, an economic opportunity and simultaneously a governance challenge. Within and across documents, certain ways of discussing charcoal are repeated, resulting in a predominant narrative about charcoal, the sector, the producers, and actors along the value chain who, consciously and unconsciously, can influence what are considered appropriate ways to address all or parts or the sector (interventions).

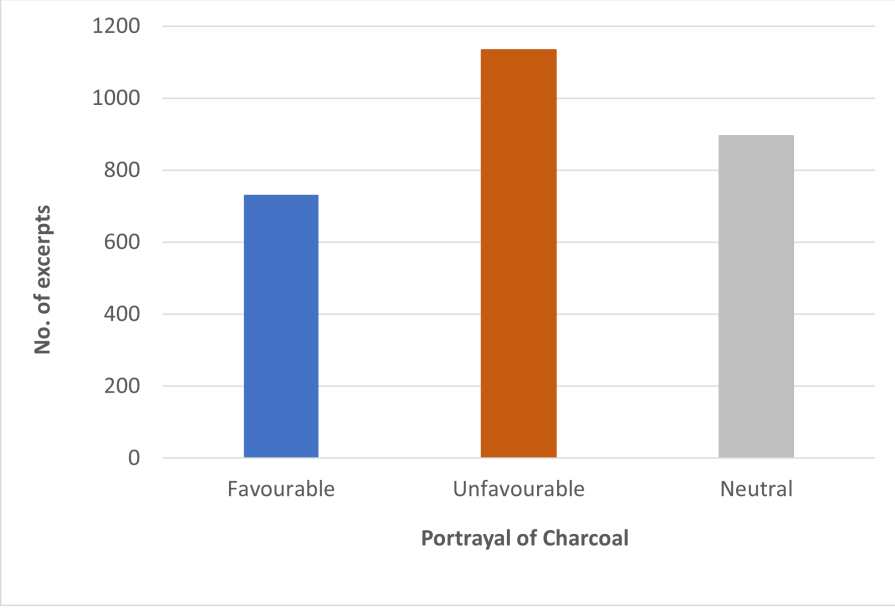
Is charcoal good, bad or ugly?

Most comments about charcoal in policy documents were negative and tended to discuss charcoal unfavourably (see Figure 10 and Table 3). Neutral and positive portrayals of charcoal were also identified; neutral statements were mostly related to citations of facts and statistics on charcoal or in definitions of charcoal (for example in the glossary sections of policy documents). However, since facts are usually consciously or unconsciously selected to support a

given narrative, even neutral statements can be further scrutinized to indicate a positive or negative attitude towards charcoal.

Academic literature often discusses the dominance of negative portrayals of charcoal in policies. Reviews of attitudes towards charcoal have shown that charcoal is often described as a "backward", "obsolete", "traditional" and "inferior fuel" and the sector as "inefficient", "unsustainable", "informal", "illegal" and "economically unviable" (Branch *et al.*, 2022; Doggart and Meshack, 2017; Mwampamba *et al.*, 2013; Zulu and Richardson, 2013.) These and similar portrayals of charcoal are numerous in the policy documents that were reviewed.

Figure 10. Number of excerpts discussing charcoal in a favourable, unfavourable, or neutral light



Source: Authors' own compilation.

Table 3. Examples of favourable, unfavourable, and neutral portrayals in charcoal policy documents

Favourable portrayals	Unfavourable portrayals	Neutral
"The biomass potential constitutes a capital asset for the revival and the development of a biomass-energy sector to ensure in the short and medium term the access of all to energy, the economic, sanitary and social development while respecting the environmental stakes." Burundi Energy Programme 2015	"Deforestation linked on the one hand to the extension of agriculture and on the other hand to the exploitation of forest resources for the production of wood energy (wood and charcoal) is at the origin of the important imbalance between supply and demand [of wood resources]" Burundi BEST 2011	French language neutral portrayals are missing
"Forest-based economic activities, such as charcoal production and the sale of forest products, contribute more than 25% of rural household income and reduce the impact of droughts and hard times." Burkina Faso Environment Strategy 2010	"In addition to the fact that this activity [charcoal production] is one of the causes of the overexploitation of forest resources, it is most often practiced in conditions that do not respect environmental protection." Burkina Faso Environment Strategy 2010	French language neutral portrayals are missing
"Available biomass energy resources have to be used in a sustainable way to strengthen the development of rural areas and to secure income for local people. Besides renewable energy sources reduce CO_2 emissions in comparison to the use of fossil fuels." Ethiopian Energy Strategy 2013	"Ethiopia's remaining forest resources are under threat, inter alia, from agricultural expansion and unsustainable fuel wood collection, inadequacy of legal and regulatory frameworks coupled with their poor implementation, institutional instability of the forest sector and poor capacity, all these compounded with economic, cultural and demographic factors." Ethiopian Environment Strategy 2018	"The energy sector is one of the least developed in the world with 90 per cent of needs being met from biomass fuels, particularly wood, charcoal and animal dung." Ethiopian Environment Policy 1997
"The charcoal industry is also part of the informal sector and is by far the largest contributor to job creation, employing approximately 700,000 people, who in turn are believed to be supporting 2.3–2.5 million dependents." Kenyan Forestry Programme 2016	"The continued decimation of wildlife and loss of critical habitats is faced with human encroachment, with activities such as overgrazing, poaching and charcoal burning in the niche areas that are tourist attractions affecting the sector." Kenyan Multisectoral Strategy 2016	"Biomass fuels are the largest source of primary energy in Kenya with wood-fuel (firewood and charcoal) accounting for about 69% of the total primary energy consumption." Kenyan Energy Policy 2018

Source: Authors' own compilation from documents analysed.

What issues is charcoal associated with?

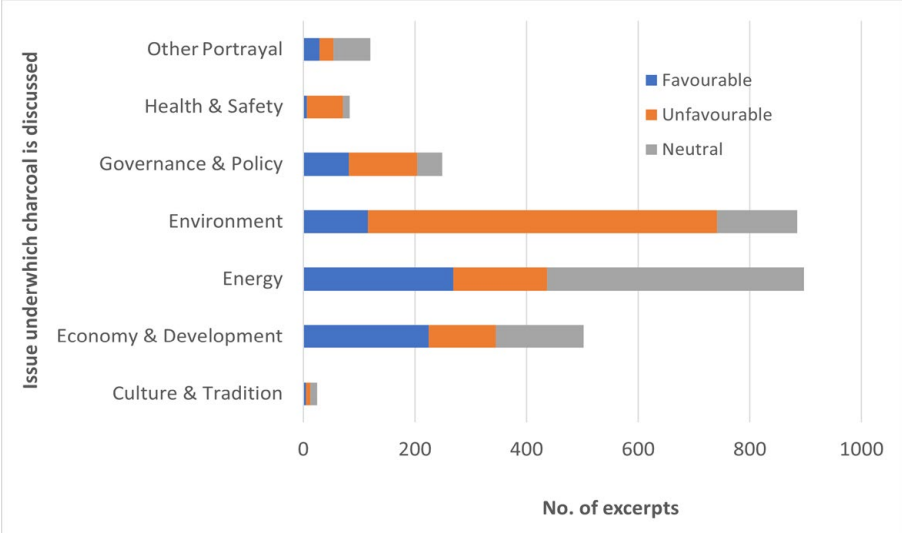
Perhaps unsurprisingly, policy documents refer to charcoal as primarily an Environmental and Energy issue, and to a lesser extent as an Economy & Development issue and as a Governance & Policy issue (see Figure 11). It is notable that charcoal is rarely discussed as a Health and Safety issue, even though numerous studies conducted on the African continent (particularly in Ghana, Kenya, Malawi and Nigeria) have repeatedly demonstrated the negative

health effects on women and children of exposure to indoor air pollution caused by smoke from charcoal cookstoves (Tzanakis *et al*., 2001; Ellegård, 1994; Hamatui *et al*., 2016). Work-related hazards of charcoal production and processing have also been reported in the literature, demonstrating the heavy health toll that charcoal takes on producers (Obiebi and Oyibo, 2019).

Charcoal is rarely cast as a Culture & Tradition issue in policy documents, despite its ancient roots and key contributions to major leaps in human civilization (such as facilitating the Iron Age (Schwarcz, 2017)). Modern-day charcoal consumption can be viewed as contributing to the maintenance of local traditions of food preparation or as having a role in safeguarding traditional knowledge, skills and technologies. Alternatively, it can be perceived as a fuel or sector that contradicts contemporary aspirations of modernization (these were the few unfavourable references to charcoal as a Culture & Tradition issue).

The distribution of favourable and unfavourable portrayals of charcoal across issues provides some insights into a predominant narrative that is shared among the 31 countries. In this narrative, charcoal is acknowledged as an important energy while simultaneously associated with major environmental challenges. Many documents also recognize that governance of the sector needs to be improved. As such, a preliminary continent-wide narrative could be that "Despite the many threats that charcoal poses for the environment, charcoal production and use contribute significantly to the economy and secures energy for cooking in urban households; governance and policy of the sector is inadequate and needs to be improved."

Figure 11. Issues or topics under which charcoal is discussed and how charcoal is discussed relative to those issues

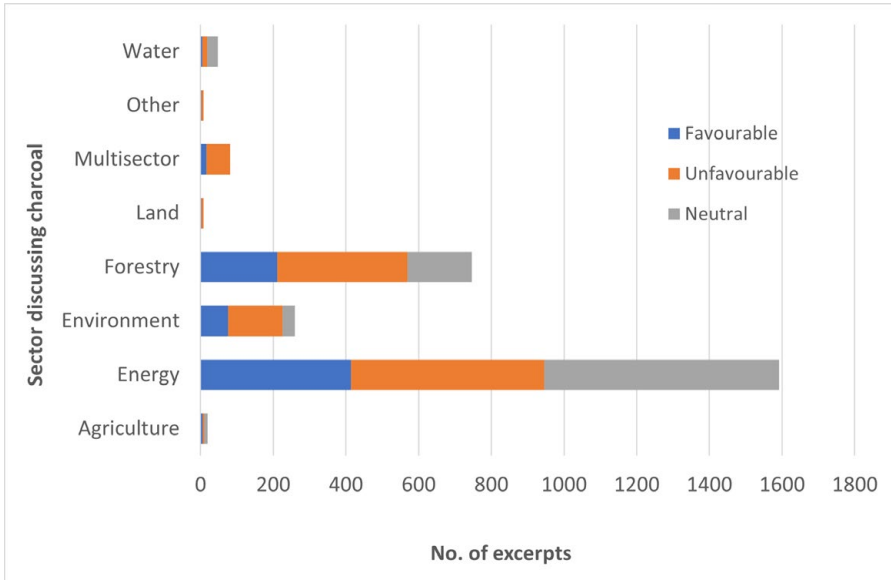


Source: Authors' own compilation.
Note: Neutral statements from French language documents are not represented in this graph.

Charcoal portrayal by sector

Documents from the Energy, Forestry and Environment sectors contributed the most material (excerpts) for assessing how charcoal is perceived and portrayed in policies (see Figure 12). Portrayals of charcoal are consistent across the three sectors: charcoal is more often identified as a challenge than as an opportunity, and all sectors recognize the double-edged nature of producing and consuming charcoal. However, while the Energy sector is more balanced in its portrayals (to note: most text from the Energy sector originates from the Biomass Energy Strategies of 11 countries), the Environment and Forestry sectors tend to emphasize the challenges and are less likely to discuss the opportunities.

Figure 12. Portrayal of charcoal by sector



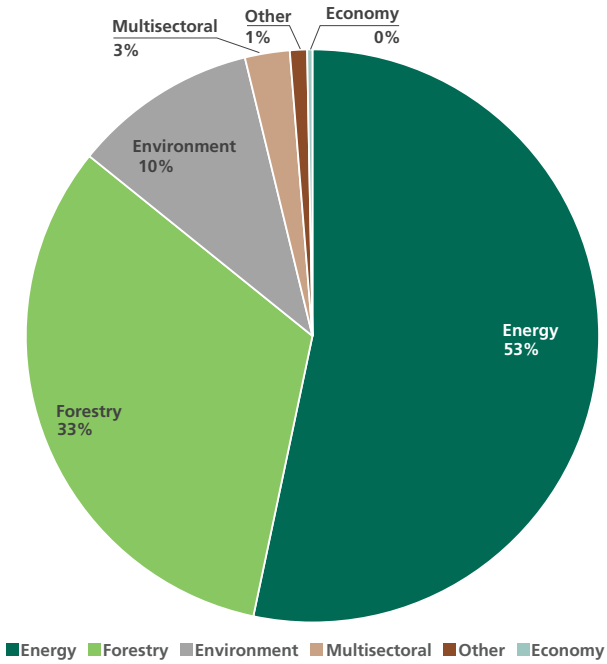
Source: Authors' own compilation.

Note: X-axis represents the amount of text that provided relevant information about portrayal.

3.4. STRATEGIES AND INTERVENTIONS POLICIES

For the most part, interventions were confined to policy documents authored by the Energy, Environment, Forestry and Multisectoral sectors, suggesting that these are the main sectors proposing interventions (see Figure 13). Over half of the proposals were from the Energy sector, but this is not surprising given that biomass and renewable energy strategies are usually produced by this sector. Policy documents from the Economic, Land Use, Agricultural, and Finance and Tax sectors rarely proposed interventions (see Figure 13).

Figure 13. Percentage of intervention codes by sector



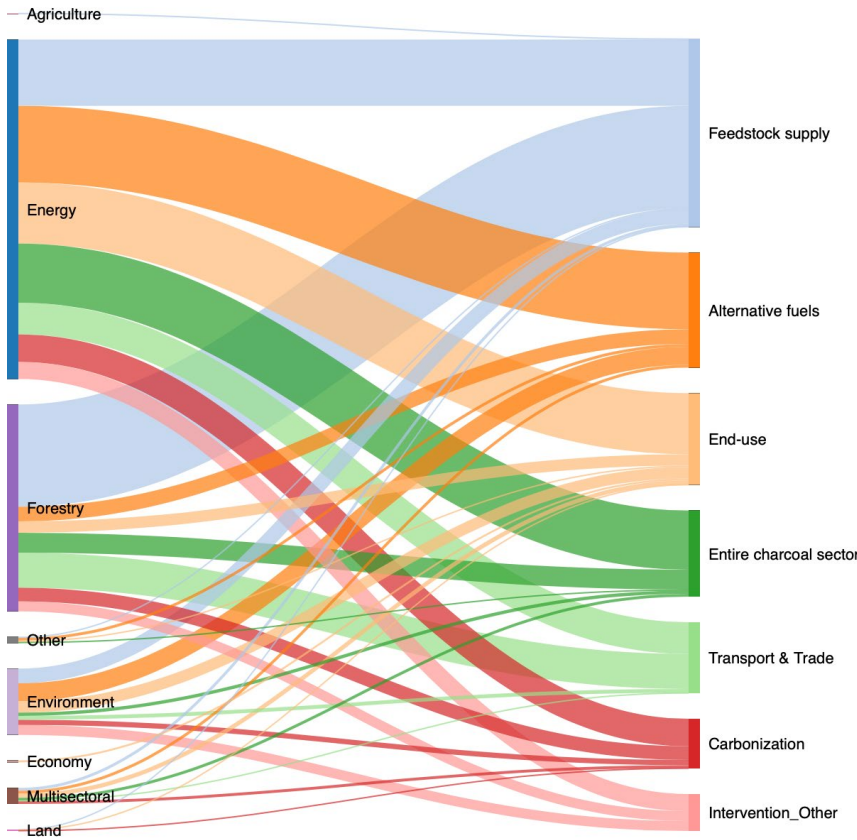
Source: Author's own compilation.

Figure 14 illustrates how interventions are attributed to various stages of the charcoal supply chain for each sector. Most interventions were proposed for the feedstock supply stage and these interventions were proposed primarily in energy, forestry and environment policy documents. It was also common for these sectors to propose interventions that addressed the full supply chain.

Over half of the proposals (54 percent) for addressing feedstock supply were proposed by Forestry sector, and about one-third of these proposals were in the category of government and management interventions, such as promotion of community and agroforestry measures, developing sustainable action plans for forest management and encouragement of commercial tree planting. Another large portion (36 percent) of the feedstock interventions in the Forestry sector were related to laws and regulations and law enforcement, such as around licensing, permits and transport of charcoal. In the Energy sector, capacity building for entrepreneurs and communities was commonly mentioned, as well as governance and management issues related to managing feedstock (such as promotion of commercial plantations, organizing charcoal producer groups, promoting professionalism in the sector).

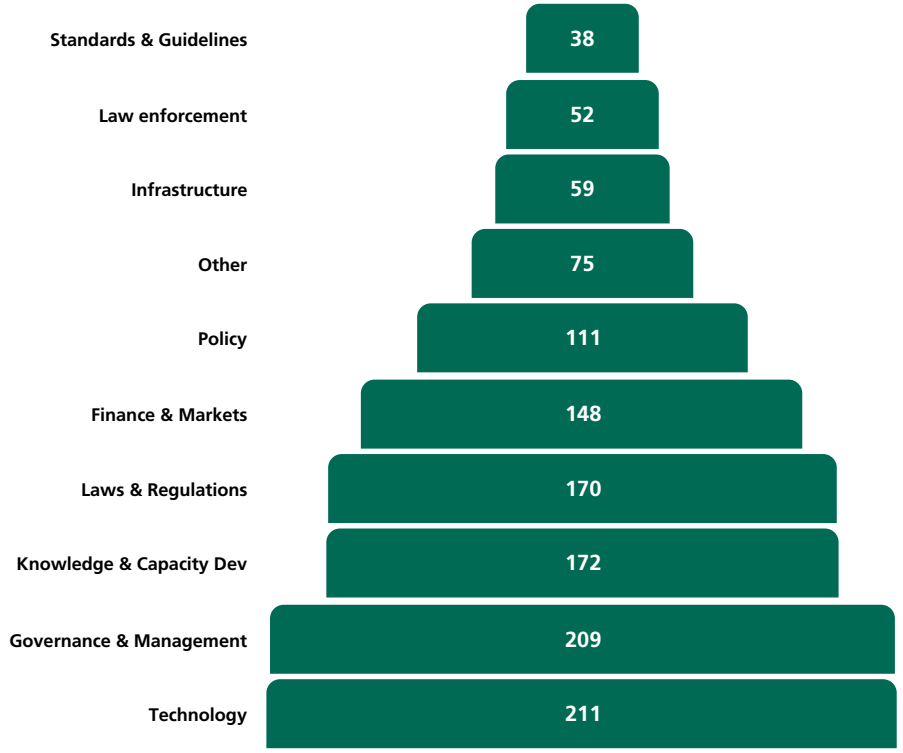
The second largest proportion of interventions was related to energy transitions whose principal objective is to introduce alternative fuels to reduce charcoal consumption. As might be expected, energy transitions were mostly proposed in documents from the Energy sector and included promoting alternative fuel technologies such as liquefied petroleum gas or butane over charcoal. Interventions affecting end-use stages of the supply chain were also frequently proposed; most end-use interventions were related to improving cookstove technology and enhancing knowledge and capacity building for developing or promoting clean and efficient cookstoves. The primary focus of interventions promoting technology was to increase the uptake of improved cookstoves and to improve the efficiency of charcoal production. For knowledge and capacity building, the result was similar, with a focus on building capacity for the clean cooking sector.

Figure 14. Flow diagram illustrating how mentions of sector interventions corresponded to different stages of the charcoal value chain



Source: Authors' own compilation.

Figure 15. Frequency of mentions of each type of intervention in the policy documents



Source: Authors' own compilation.

The most frequently proposed interventions were technological in nature and Governance & Management interventions (see Figure 15). Knowledge & Capacity, Laws & Regulations, and Finance & Markets (such as providing tax incentives, charging fees, market facilitation) followed in terms of frequency, followed by Policy-related interventions. The least mentioned interventions were those relating to the development of Standards and Guidelines for the charcoal sector (mostly cookstoves and charcoal quality). Table 4 provides a list of examples of types of intervention proposed under each category.

Table 4. Types of interventions proposed by or advocated for in charcoal policy documents

Type	Examples of interventions (direct citations from policy documents)	Country/document
Standards & Guidelines	Establishing efficiency standards for charcoal kilns.	Eswatini: Swaziland National Energy Policy, 2003
	Establishing standards, certification and label on charcoal production for end users.	Sierra Leone: National Renewable Energy Action Plan (2015)
Laws and Regulations and Law Enforcement	Ban on cutting or burning of trees from public or provisional forest without a licence.	Kenya: The Forest Conservation and Management Act (2016)
	Improving enforcement of existing regulations against uncontrolled and unsustainable production of charcoal.	Malawi: National Forest Landscape Restoration Strategy (2017)
	A person shall not export charcoal from Zambia either from plantation or natural forest.	Zambia: The Charcoal (Prohibition of Exportation) Order (1999)
	No person shall import charcoal or charcoal products into Kenya unless they have obtained an import permit issued by the (Forestry) Service.	Kenya: Forest (Charcoal) Rules (2009)
Alternatives	The use of natural gas could help to reduce heavy reliance on fuelwood, as well as promote industrial development of addressing electricity security issues.	Eswatini: Kingdom of Eswatini Energy Masterplan 2034
	Efforts will be concentrated on promoting the use of cooking gas in urban areas.	Rwanda: 7 years Government Program National strategy for transformation (NST 1) (2017)
	Development of Clean Cooking Programme and Off-grid Renewable Energy Programme to reduce woodfuel consumption.	Ethiopia: National Forest Sector Development Program, Ethiopia. Volume II: Program Pillars, Action Areas and Targets (2018)
Technology	Diffuse alternative technologies to a wide distribution of households to decrease wood fuel consumption by 50%.	Burundi: Élaboration de la Strategie Sectorielle pour le Secteur de L'énergie au Burundi (2011)
	Expansion of small-scale entrepreneurs manufacturing improved cookstoves.	Zambia: National Forestry Policy (2009)
	Increase the use of improved cookstoves.	Rwanda: Energy Sector Strategic Plan (2018)
Knowledge & Capacity Development	Promotion of efficient technologies and best practices.	Guinea: Stratégie Nationale sur le Changement Climatique (2019)
	Organizing and training of charcoal producer groups.	United Republic of Tanzania: Tanzania Biomass Energy Strategy and Action Plan (2014)

Type	Examples of interventions (direct citations from policy documents)	Country/document
Finance & Markets	Eco-labelling of charcoal produced from efficient technologies to promote market access.	Kenya: National Strategy for Achieving and Maintaining over 10% Tree Cover by 2022 (2019)
	Establishment of Rural Energy Fund to fund strategies for resolving wood fuel crisis.	Zimbabwe: National Energy Policy (2012)
	Improving the collection of fees on harvesting of forests for energy production is essential to putting a price on forestry resources for energy.	United Republic of Tanzania: Tanzania Biomass Energy Strategy and Action Plan (2014)
Governance and Management	Developing local forest management plans would enable local authorities to define their forestry resource base and put in place plans to sustainably manage these areas.	United Republic of Tanzania: Tanzania Biomass Energy Strategy and Action Plan (2014)
	Developing management plan for natural forests and commercial plantations.	Burundi: Élaboration de la Strategie sectorielle pour le secteur de l'énergie au Burundi (2011)
	Encouraging the establishment of private and community woodlots for supply of woodfuel in the short term	Sierra Leone: National Renewable Energy Action Plan (2015)

Source: Authors' compilation from documents analysed.

3.5. ROLES AND RESPONSIBILITIES FOR THE CHARCOAL SECTOR

Policy documents – and particularly regulations and acts – were often clear about the government and non-government actors who had roles and responsibilities in the charcoal sector. Where they existed, such regulations specified which government authorities were responsible for overseeing the charcoal sector, and for legally engaging in charcoal production, transport and trade. As such, regulations and acts were some of the most obvious ways for governments to indicate those who are currently considered legitimate actors. Being more visionary in nature, national strategies and policies were better at giving indications of actors' legitimate stakeholders, who are recognized as having or needing to have roles and responsibilities in the management, governance or finance of the charcoal sector.

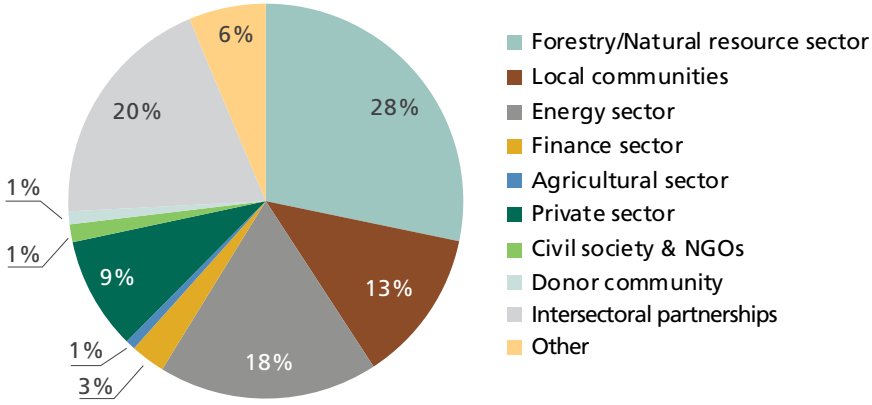
When this is taken into account, the governments identify a wide range of actors from the public and private sector, which were grouped into ten categories (see Figure 16). Among government entities, authorities responsible for forestry and natural resource management were the most frequently mentioned. This was the case for over half of the countries reviewed. The

energy sector and intersectoral partnerships were the second-most frequently mentioned actors, followed by local communities (12.6 percent) and the private sector (9.2 percent). Participation of the private sector was often justified to stimulate more efficiently-scaled commercial activities, either through forest or woodlot plantations or charcoal producer associations. The private sector accounted for 9 percent of the mentions regarding responsibility.

Across countries, there are substantial differences in how many stakeholders' policies recognize and acknowledge as legitimate participants in the charcoal sector (see Figure 17). Only four countries identified actors in nine of the ten categories; several identified five or fewer actors, while South Africa did not mention any at all. The four countries that recognized the largest number of actors (Malawi, Senegal, Togo and the United Republic of Tanzania) also happen to have developed a Biomass Energy Strategy (BEST) or equivalent. This is consistent with the BEST process, which requires the involvement and consultation of a wide range of stakeholders.

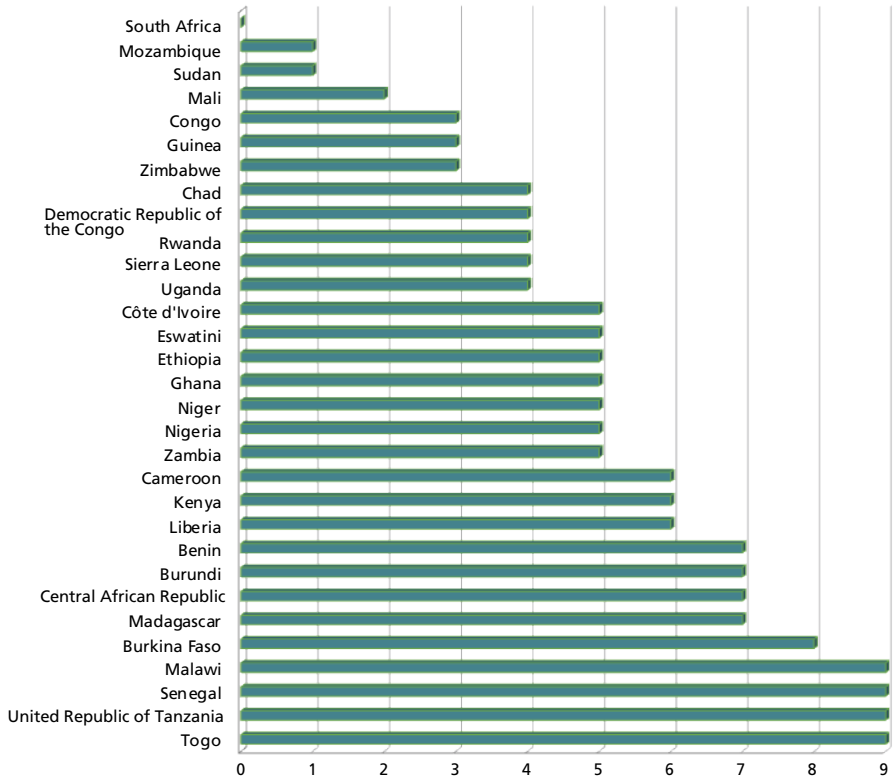
The finance sector, civil society and NGOs, the agriculture sector and donor communities were rarely mentioned, suggesting that most governments have not identified a specific role that these actors could have, despite their potentially strong influence, particularly in activating local communities, competing with forest and land use, or financing the governance and oversight of the sector. Notably absent from the list of government stakeholders that could engage with the charcoal sector are the health sector (given the health implications of charcoal use and production), the labour sector (given the number of livelihoods for which policies acknowledge the charcoal sector to be responsible), and the women and gender sectors.

Figure 16. Actors recognized by policies as having roles or responsibilities in managing, financing and/or governing the charcoal sector



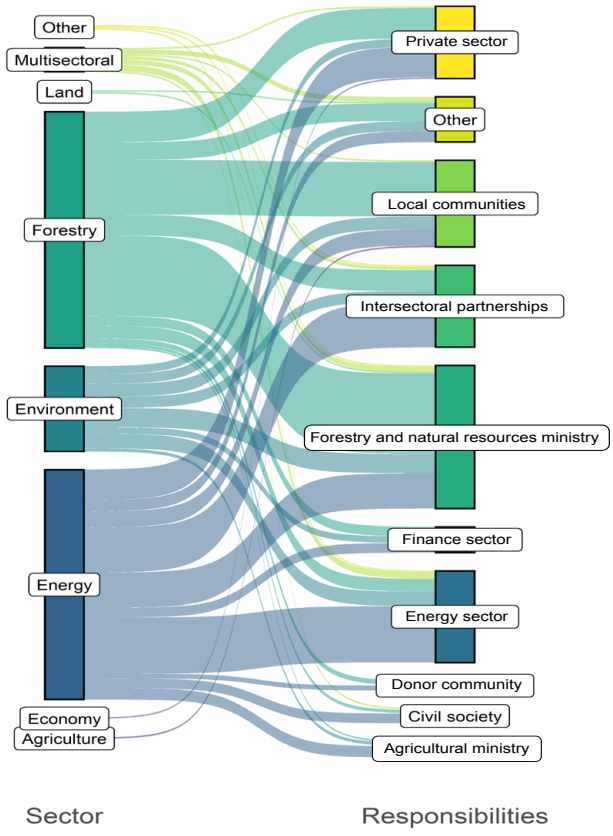
Source: Authors' own compilation.
Note: These were usually suggestions that indicate intent and recognition of the actor's roles; they do not necessarily reflect actual participation of actors today.

Figure 17. Number of actors mentioned by country for their role in managing or contributing to improvements in the charcoal sector



Source: Authors' own compilation.

Figure 18. Sector recognition of stakeholder roles and responsibilities

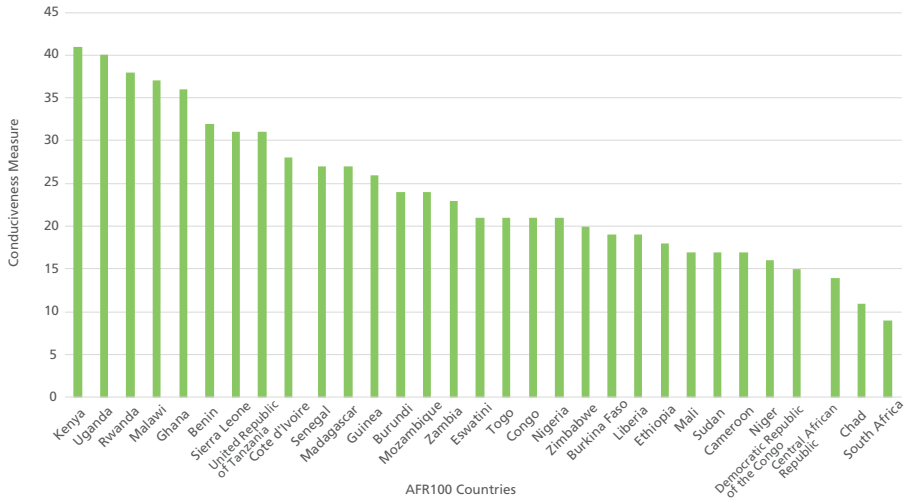


Source: Authors' own compilation.
Note: Sankey diagram illustrating how sectors (left column) recognized different types of actors and stakeholders (right column) as having or needing to have roles and responsibilities in the charcoal sector.

3.6. CONDUCIVENESS OF POLICIES TO SUSTAINABILITY INTERVENTIONS IN THE CHARCOAL SECTOR

Countries' conduciveness scores ranged from nine to 41, with no country reaching the highest possible value of 42 (see Figure 19). However, Kenya was the highest scoring country (score = 41), while South Africa was the lowest.

Figure 19. Conduciveness measure for each AFR100 country



Source: Authors' own compilation.

A potentially useful way of applying the scores to discuss the relative conduciveness of policies is to generate a gradient of conduciveness based on the performance of countries. For example:

- Highly conducive environment = 36–42
- Medium-high conducive environment = 35–30
- Medium conducive environment = 29–26
- Low-medium conducive environment = 25–21
- Low conducive environment = 20–15
- Non-conducive environment = less than 15

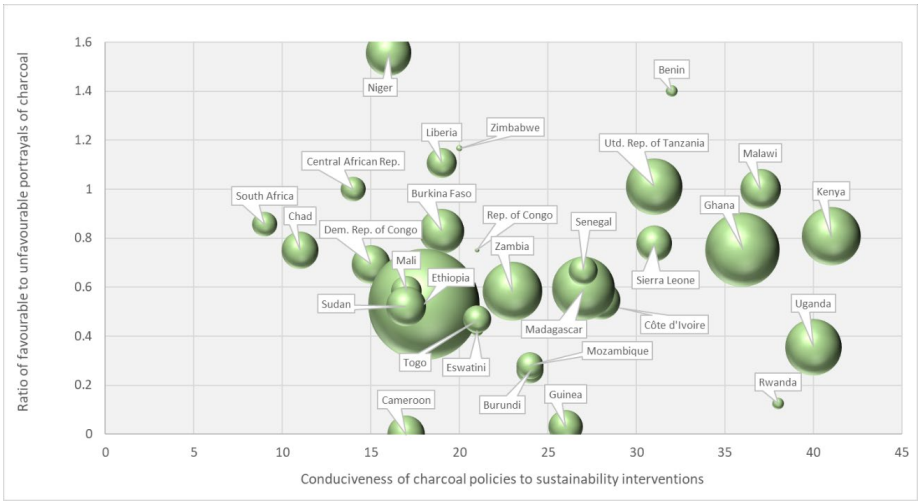
In this way, it can be said that only a handful of countries (Kenya, Uganda, Rwanda, Malawi and Ghana, in order of conduciveness measures) may be considered as providing the potential for a highly enabling policy environment for their charcoal sector (scores > 35.) The policies of Benin, Sierra Leone and the United Republic of Tanzania provide a medium-high conducive environment and most countries provide medium to low-medium conduciveness. Only three countries (Central African Republic, Chad and South Africa) have low and unconducive environments.

Note that these scores capture the policy intent and vision of the country for its charcoal sector; they do not capture how well those intentions are subsequently operationalized by systems, whether such operationalization is effective, nor actors' actual experience with trying to implement sustainable practices under these policies. As mentioned earlier, this type of analysis requires a follow-up study that would need to focus on the implementation of regulations, guidelines and laws.

What determines conduciveness?

Given that the conduciveness score sums up the responses to 42 questions distributed across five elements of conduciveness, rather than a single attribute, it is a combination of factors that contribute to the performance of countries. It is notable, however, that some intuitive hypotheses of what could explain conduciveness can potentially be dismissed. For example, countries that tended to discuss charcoal more favourably than unfavourably (ratio is > 1) were not more prone to higher conduciveness scores, (see Figure 20); nor were those that produced the most charcoal. Although no significant effect of forest cover loss was detected, it is notable that countries with high forest cover loss in the last 20 years (such as Burkina Faso, the Democratic Republic of the Congo, Ethiopia and Nigeria) were not among the high scorers; they are in the low range of conduciveness.

Figure 20. Relationship between conduciveness score and ratio of favourable to unfavourable portrayals and volume of charcoal production for AFR100 countries

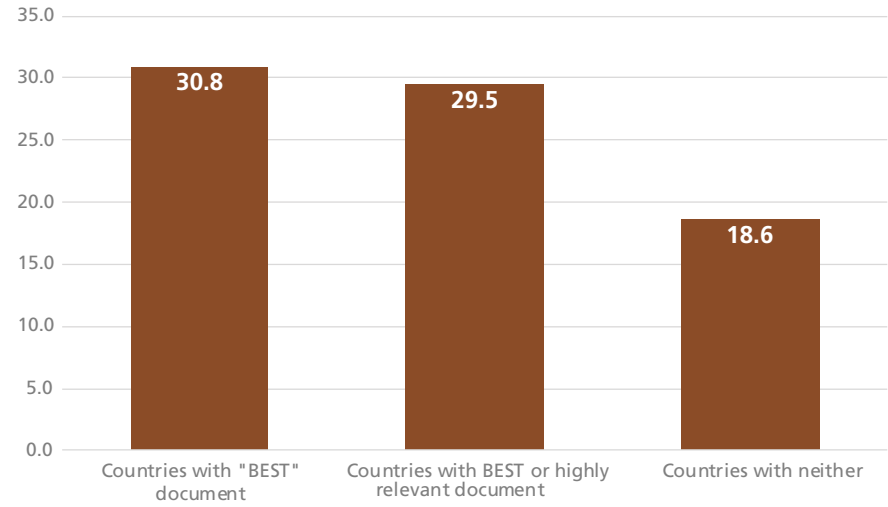


Source: Authors' own compilation.
Note: Nigeria datapoint overlaps with that of Ethiopia. Size of bubble represents 2020 charcoal production (in metric tonnes).

The key factor contributing to high and medium-high scorers (score > or equal to 30) was the existence of well-developed and relatively complete regulatory frameworks which, in essence: a) permitted the production of charcoal; b) specified the conditions for which charcoal production was permitted; and c) provided policies, strategies, action plans, guidelines and regulations, and thus, coherent guidelines for the charcoal sector and identified a large set of charcoal stakeholders. Countries score high if they have clear

regulations for charcoal production, trade, transport and export, even if the total number of policy documents was low, or charcoal was not explicitly mentioned in policy documents (such as in the case of Benin). Consequently, with the exception of Benin, all the other countries in the medium-high to high range of conduciveness have BESTs or equivalent strategies. In the case of Malawi, a Charcoal Strategy exists, in addition to the BEST.

Figure 21. Average conduciveness score for countries with relevant charcoal policy documents versus those without highly relevant documents



Source: Authors' own compilation.
Note: A highly relevant policy document was one that mentioned charcoal more than 20 times.

Countries with BESTs were more likely to discuss charcoal explicitly, recognize its importance to livelihoods and the national economy, and propose interventions across the entire value chain, including the entire sector. The process of developing BESTs required the involvement of multiple actors and is thus more likely to identify a wider range of potential stakeholders to govern, manage and finance the sector. However, it should be noted that several BESTs are still in draft form and are not yet being implemented. This means that the conduciveness score needs to be viewed as a potential score rather than the actual reality, for stakeholders wanting to engage with the sector today.

Countries whose focus was more on transition to alternative sources and types of energy for cooking were more likely to score low on conduciveness because they failed to discuss how sustainable charcoal could be produced, traded and consumed. This is the case for the Central African Republic, Chad and South Africa whose approach to "dealing" with the charcoal sector is to

prohibit in-country production, import charcoal and focus on alternatives. In such an approach, the only actor deemed necessary was the energy sector.

The absence of an intersectoral approach for addressing the charcoal sector forgoes linkages among sectors that are necessary for holistically addressing the complex issue of unsustainable woodfuel. System-level approaches would enable synergies among sectors and actors and improve understanding of the potential trade-offs across sectors (for example, does promotion of woodlot plantations compete with food production? Or do woodlots impact water availability?).

The study applied a generalized linear model (GLM) fit to explore what other factors might help explain countries' conduciveness scores. For the GLM, variables that characterize countries were included in terms of governance quality criteria (such as government effectiveness, voice & accountability, political stability, rule of law, and control of corruption), their GINI coefficient[2] (as in, discrepancies between rich and poor) and Human Development Index, their rates of forest cover loss between 2018 and 2019, and their domestic charcoal consumption and electrification rates. Of these 12 attributes of countries, three were identified as significant variables, best able to explain conduciveness scores: the GINI coefficient (measure of income inequality); 2020 domestic charcoal consumption; and rates of forest loss between 2018 and 2019.

Countries with a low GINI coefficient (more equal incomes), high recent forest cover change (high rates of deforestation) and high domestic charcoal consumption were associated with higher conduciveness scores. This suggests that those countries that perceive large supply-demand imbalances currently or in the near future are more likely to invest in developing a policy framework for charcoal that condones charcoal production under specific conditions and provides clear guidelines to describe the condition and facilitate stakeholder engagement with the sector.

[2] The Gini coefficient is a measure of statistical dispersion intended to represent the income inequality or the wealth inequality within a nation or a social group.

Effect of charcoal "bans" on policy conduciveness

The existence of a robust regulatory framework for charcoal can be affected by temporary and/or longer-term ordinances and declarations that override existing regulations and policies (Njenga, 2018; Mabele, 2020; Wells *et al*., 2022). In the case of charcoal, bans on logging or on internal and cross-border trade and transport, and changes in land and forest tenure introduce drastic changes to the status quo, often by applying a blanket policy to all actors and activities regardless of their actual impact. In 2018, for example, the Government of Kenya imposed a ban on logging, transport of woodfuels and trading with a number of countries (Njenga, 2018). While bans such as these are put in place to slow the use of woodfuels and encourage the uptake of alternatives, they generally interrupt the supply of charcoal to consumers, increase prices and expand the informal market, with opportunities for corruption. This can make it more difficult to monitor the market and shift consumption to products from neighbouring countries rather than reduce demand, as is the case with the bans in Kenya and Uganda (Haysom *et al*., 2021).

The study reviewed the status of bans for the top eight ranked countries in the conduciveness index and the impact of such bans as reported in the media and in other publicly available documents (see Table 5). The reported effect of bans in the sources reviewed is often described as disruptive, unrealistic, contradictory and short-sighted, with reports that they ultimately hinder rather than facilitate sustainability interventions. The predominantly negative view of bans suggests that the "real" conduciveness scores of countries with bans is likely to be lower than the potential score (see Figure 20). To determine the extent to which bans affect conduciveness would require a more thorough assessment of bans, which includes verification of impacts on stakeholders and the environment in the field.

Table 5. Summary of impact of charcoal bans on conduciveness measure in selected countries

Country & conduciveness. measure	Type of ban	Status (is it still in effect?)	Impact	Affect the conduciveness measure?	Source
Kenya/41	Ban on harvesting of wood and transport of biomass (02/2018)	Harvesting ban still in effect; transport ban has been lifted.	Corruption has led to smuggling as charcoal producer associations are left without ability to earn income. Increased trade from Uganda suggests that domestic production has been suppressed somewhat.	Lowers the score	Sola, P. & Cerruti, P. 2021. CIFOR. Kenya has been trying to regulate the charcoal sector and why it's not working. The Conversation. https://theconversation.com/kenya-has-been-trying-to-regulate-the-charcoal-sector-why-its-not-working-154383
Uganda/40	No national ban, but some regional bans on production. There is a ban on exports that is largely ignored.	Still in effect	Uneven impact of bans has led to improvements in some districts and not in others.	Lowers the score	Haysom, S., McLaggan, M., Kaka, J., Modi, L. & Opala, K. 2021. Black gold: the charcoal gray market in Kenya, Uganda and South Sudan. Global Initiative Against Transnational Crime. https://globalinitiative.net/wp-content/uploads/2021/03/Black-Gold-The-charcoal-grey-market-in-Kenya-Uganda-and-South-Sudan.pdf-GITOC.pdf
Rwanda/38	In 6/20 Rwanda banned the use of charcoal in Kigali for cooking.	Status unknown		Unclear impact	Government to ban charcoal use in Kigali. The New Times, May 28, 2020. www.newtimes.co.rw/news/government-ban-charcoal-use-kigali
Malawi/37	Ban on unsustainable charcoal production – even by smallholders.	Still in effect	Although the Government has added teeth to the ban with new enforcement efforts, smallholders can still circumvent the law – very few sustainable charcoal permits have been issued.	Unclear impact	Smith, Hudson & Schreckenberg. 2017. Livelihood diversification: the role of charcoal production in southern Malawi. Energy for Sustainable Development. www.sciencedirect.com/science/article/pii/S0973082616302319

Country & conduciveness. measure	Type of ban	Status (is it still in effect?)	Impact	Affect the conduciveness measure?	Source
Ghana/36	Regional bans exist, such as that of the Savannah Regional House of Chiefs, which has placed a complete ban on illegal logging, commercial charcoal burning, commercial fuelwood harvesting, and illegal small-scale mining activities, effective since 10 May 2021. The Government of Ghana has been considering a ban on charcoal exports. The potential for a ban was announced by the Minister of Lands and Natural Resources in December 2021.	Unclear if this ban is still in effect; no update on whether the Government has gone ahead with the proposed export ban.	Criminalization of all commercial charcoal activities, making it very difficult for producers to work openly. Risk of expansion of the informal market; prices usually rise, making charcoal unaffordable to urban poor, forcing them to shift to lower-quality fuels. Does not make exceptions for producers who might be producing charcoal sustainably. The absence of a clear decision on whether an export ban will be placed introduces a great deal of uncertainty for the sector.	Lowers the score	Ghana: Savannah Regional House of Chiefs has bans charcoal burning, fuel-wood, rosewood harvesting. Ghanaian Times, October 2021. https://allafrica.com/stories/202110110781.html
Benin/32	No bans clearly articulated.				
Sierra Leonne/31	Some local bans on charcoal production and a rescinding of forest concessions and a ban on exports of logs (2018).	Still in effect	An analysis of the ban on logging has shown that it has not improved sustainability in the sector due to the fact that it has not impacted domestic demand.	Lowers the score	Kamara, M.J. & Su, L. 2019. Sierra Leonean log export ban policy: balancing sustainable forest management and the economy. International Journal of Science and Research. www.ijsr.net/archive/v9i9/SR20902050226.pdf

Country & conduciveness. measure	Type of ban	Status (is it still in effect?)	Impact	Affect the conduciveness measure?	Source
United Republic of Tanzania/31	Government Notice 417 issued on 24 May 2019 removes power from communities (issued in Forest Act 2012) to prepare management and harvesting plans and by-laws. It requires that management and harvesting plans are prepared by the Director of Forest and Beekeeping Division.	Still in effect	Communities have previously worked with NGOs to prepare management and harvesting plans. Many feel that the Government does not have the capacity to prepare such plans at the scale needed and there is a risk of applying a "one-size-fits-all" approach that ignores distinctions in forests, climate and traditional knowledge and management. This measure has halted charcoal production in communities currently undertaking sustainable harvesting plans that were prepared by NGOs.	Lowers the score	https://gazettes.africa/gazettes/tz-government-gazette-dated-2019-05-24-no-21

4. Key findings

Ten key findings can be garnered from the content analysis of policy documents from the AFR100 countries:

Key finding 1: Despite high dependency on charcoal, most AFR100 countries (more than half) have not developed a robust policy and regulatory framework to explicitly address their charcoal sectors. Stakeholders interested in undertaking sustainability interventions in countries with incomplete, incoherent or misaligned policies are unlikely to find clear guidelines to do so, and their efforts would quickly be frustrated.

Key finding 2: Even when countries provide a regulatory framework for their charcoal sectors, these may not be conducive to sustainability interventions. The potential conduciveness of eight of the 31 countries is medium-high to high; all other countries have low conduciveness scores. Large charcoal consuming countries (among the top ten global producers) such as the Democratic Republic of the Congo, Ethiopia and Nigeria are not yet providing conducive policy environments for their charcoal sectors. The eight medium-high and high conduciveness countries can serve as desirable references for other countries, especially if stakeholders in those countries characterize the environment as enabling (it should be noted that this was not assessed in the study). Unconducive policy environments enable the proliferation of unsustainable value chains; they would make it financially unviable for sustainability-promoting initiatives to compete.

Key finding 3: The existence of Biomass Energy Strategies (BESTs) or equivalent strategies (in particular, sustainable energy for all strategies or renewable energy strategies) should not be equated with the existence of a conducive policy environment for charcoal-related interventions. BESTs can de-emphasize charcoal and focus on transitions to other types and sources of fuel, such as in the case of Ghana, whose BEST is focused almost exclusively on promoting liquid biofuels rather than solid woody biomass fuels. In such cases, charcoal interventions would find a highly unconducive environment, despite the existence of a BEST.

Key finding 4: Charcoal is mostly discussed negatively in policy documents. However, the predominance of unfavourable depictions of charcoal in policy documents may not affect the potential conduciveness of policies. Nonetheless,

almost all countries with high potential conduciveness provide more balanced narratives of charcoal in their policy discourses (that is, the ratio of favourable to unfavourable portrayals is closer to 1). Being able to perceive both the potential and limitations of charcoal most likely leads to an appreciation of the complexity of charcoal systems and the realization that a range of interventions are needed to address the social, economic and environmental shortfalls of charcoal.

Key finding 5: Despite the intersectoral nature of charcoal, there is a notable absence of references to health, finance, labour and agriculture links in the charcoal discourses of most countries. This means that charcoal is almost exclusively perceived as an energy-, environment- and forest-related issue, with little or no consideration of the justice and economic dimensions of charcoal, the financial aspects (other than levies and fees), and the dependencies and interlinkages between charcoal and agriculture (land use and tenure). Moreover, health-related issues (beyond respiratory illnesses) are mostly ignored. Addressing the charcoal system with a more holistic lens could widen the scope for innovation in the search for sustainability solutions.

Key finding 6: Policies tended to recognize the need for interventions along the full value chain and some suggested transformation of the entire sector. Across countries and sectors, proposed interventions were highly varied, but with a focus on addressing producer-end and user-end issues. Charcoal cookstoves were the most frequently proposed user-intervention. Interventions in feedstock supply ranged from encouraging community management of natural resources to establishing woodlot plantations, development of agroforestry systems and producing charcoal briquettes from biomass residues.

Key finding 7: Overall, while proposed interventions are adequately focused on ensuring that feedstock supply is sustainable, they rarely propose improvements in kiln management and technologies, transport and trade and other types of intervention (such as in the justice and safety dimensions), or in developing enabling policy conditions. The absence of clear proposals for improvements in the quality of life of actors along the value chain suggests that the sector is being addressed from a purely economic and environmental perspective, with little or no consideration for the human dimensions of sustainability.

Key finding 8: A strong regulatory framework with high potential conduciveness can be undermined or rendered ineffective by government notices and declarations that place a blanket policy on charcoal production and trade for the short to medium term. In a few countries for which this was checked, logging, trade and transport bans and notices restricting the full execution of existing policies and regulations introduced policy environments

that jeopardized sustainable initiatives or externalized the environmental costs.

Key finding 9: With the exception of Ethiopia, Mozambique, Nigeria and the United Republic of Tanzania, policy documents of other countries rarely discussed cross-border and international trade of charcoal. Neither did they discuss specific strategies for monitoring charcoal production, trade and use, and taking regular stock of whether policies are successful.

Key finding 10: Justifications for addressing the charcoal sector are linked to climate change, biodiversity conservation, environmental protection and sustainable development. Some interventions are proposed in National REDD+, environment and conservation strategies, without reference to the energy and forestry sectors. Given that the SDGs and the AFR100 initiatives are relatively recent, compared with when regulatory frameworks for charcoal were developed, most countries do not link their charcoal sectors to the achievement of these goals and commitments.

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5. Recommendations

Based on the findings, this report makes the following recommendations to AFR100 countries for their charcoal sectors:

- Countries that are highly dependent on charcoal and which scored low to medium on conduciveness should consider assessing their policies and regulatory frameworks and updating and operationalizing them. For such countries, it may be better to develop charcoal-specific strategies rather than BESTs. Even for those countries that scored high on potential conduciveness, comprehensive strategies are needed that better articulate the interlinkages of sectors impacting or impacted by charcoal production, trade and use.
- Countries should be encouraged to involve a diverse set of actors in the planning of new policies and strategies, following the BEST process of being highly inclusive of various stakeholders. Stakeholder inclusion should extend to sectors that are currently left out, such as finance, health, labour and justice.
- It is not enough to develop Biomass Energy Strategies (or their equivalent) if these are not supported by action plans, regulations and guidelines that are operational. Action plans and finance mechanisms for putting them into practice should be identified and implemented.
- As countries implement their strategies and forest availability decreases worldwide, it is likely that cross-border and international trade flows will increase, in which case explicit and comprehensive plans for imports and exports of charcoal should be included as part of a country's energy strategy.
- Ultimately, the policy environment is conducive if those who navigate it experience it as an enabling environment, which facilitates rather than impedes their activities and encourages the scaling up of sustainability interventions in the charcoal sector. To determine actual as opposed to potential conduciveness, stakeholders will need to be consulted.

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6. Conclusions

The consumption of charcoal in Africa is expected to grow in the foreseeable future and it is imperative that AFR100 countries develop the conditions to smoothly transition to other fuel types, or alternatively, to develop a resilient and sustainable sector that maximizes the benefits of charcoal, while minimizing the undesirable attributes of the fuel and the sector. To ensure that a wide range of public and private sector stakeholders invest their time, resources and creativity in the sector, a highly conducive environment must be developed, which motivates them to engage with the sector in the long term. However, anecdotal descriptions of the sector tend to characterize it as non-conducive to sustainability interventions.

By unpacking conduciveness into component parts ("elements of conduciveness") and then assessing the content of existing policy documents to determine how well they meet this study's criteria for conduciveness, the report provides a preliminary approach to assessing countries and comparing them against each other. It was found that it is mostly true that far too few countries provide enabling conditions for sustainability interventions in their charcoal sectors; too few stakeholders are recognized; and policies are still rather narrow in their approaches to addressing the challenges of charcoal. The existence of at least five countries with potentially highly conducive environments is, however, encouraging. These countries serve as much-needed benchmarks, against which other countries can compare themselves as they design their own approaches.

This report is an assessment of existing policies and their potential to provide a conducive environment. Policies are consistently evaluated and can be overridden by short- to long-term declarations and ordinances (such as in Kenya and the United Republic of Tanzania). Figure 1 presents a simplified framework for the steps required to create an enabling environment. Between the creation of a policy and the achievement of actual results of an intervention there are many steps. This study examines the foundational policies, and how well they are positioned to provide an enabling environment for these interventions. It should also be emphasized that further study is needed to examine the effectiveness of interventions that are taking place. A potentially enabling environment is a first step for successful interventions but may not match the experience of stakeholders if other barriers are too great to overcome.

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8. Annex. Methodological approach

8.1. DATA GENERATION AND ANALYSIS

The study was divided into three phases: a document acquisition phase, a data extraction phase, and a data analysis phase. A detailed protocol was developed to guide research participants in the process.

Phase 1: Document acquisition

A search for policy and policy-relevant documents was conducted through three main strategies. The first was by visiting the government website of each country, to become familiar with the general administrative structure of the government and understand how sectors are divided up across ministries, how ministries are categorized into subsectors, and at what level energy and environmental policies are developed. Research assistants determined if the government operates a government gazette that may list all policies currently in effect or summarizes the full set of policies relevant for a given sector. They downloaded and catalogued all relevant documents into a shared database and stored them in country-specific folders.

The second strategy for acquiring documents was a standard Google search conducted by using a string of predetermined keywords, which was developed to capture national policies, strategies, programmes and regulations related to energy and the environment. The third strategy was reserved for cases where Internet-based data acquisition proved challenging, and it became necessary to contact government representatives for copies. In such cases, a point of contact for AFR100 was established to communicate with country liaisons in order to locate missing documents.

Phase 2: Data extraction from documents

The text of each document was reviewed to determine:

- whether or not it referred to charcoal and/or the charcoal sector, and if so:
- how it portrayed charcoal and the sector;

- the interventions it proposed for the sector; and
- who it deemed to be the appropriate actors responsible for intervening and contributing to the sector.

This phase was conducted using *Dedoose* V9.0.17 (2021) a web-based software that facilitates content analysis of texts, audio and visuals. Relevant text responding to the research questions was highlighted and coded in accordance with predetermined categories and subcategories associated with the four following themes: reference to charcoal, portrayal of charcoal, proposed interventions, and responsibilities.

Reference to charcoal
Firstly, determine whether a document refers to the exact term "charcoal" or other synonyms of charcoal (such as woodfuel or wood energy or briquettes). Then, search for whether a document referred to other types of solid biomass fuels that are clearly not charcoal, such as firewood or fuelwood, pellets, bagasse. The term is coded for each time the term charcoal or its synonym is used.

Portrayal of charcoal
A broad set of categories and codes were developed to capture how charcoal was portrayed every time it was mentioned in a document. Charcoal can be recognized as an important source of energy for a country, and at the same time as an environmental threat, an economic opportunity, or a contributor to poverty alleviation. Categorizing each mention of charcoal made it possible to generate a comprehensive understanding of how a policy assesses charcoal and the charcoal sector, and the charcoal narratives that the policy advocates.

Proposed interventions
During the review of each document, all text that implicitly or explicitly proposed a solution or way to address the charcoal or solid biomass energy sector was highlighted. Interventions were categorized based on which phase of the charcoal value chain they addressed (feedstock production, conversion process, transport, trade and end-use) and what types of intervention were proposed (such as technological, institutional, regulatory, market-based). For example, proposals to promote community-based forest management to secure sustainable feedstock were identified and categorized as both a feedstock production and institutional intervention. Certification schemes were categorized as producer-end, market-based if they were related to certifying forest management, or user-end, market-based if they referred to certification of cookstoves.

Responsibilities for the charcoal sector
Wherever interventions were proposed in a document, it was established if the text implicitly or explicitly mentioned who should deal with the charcoal sector, that is, who is responsible for undertaking the interventions? Documents may have mentioned the sector or government body or department that is deemed responsible from the government perspective, but they may also have specified which additional actors should be involved.

Phase 3: Data analysis

A mixed methods approach was used to analyse the data. Since all the extracted texts and excerpts are associated with specific policy-related documents and all documents are associated with specific countries, it was possible to conduct a multi-level assessment to characterize documents, sectors and countries. Moreover, all countries were associated with additional energy and environmental country-level descriptors that were obtained independently. These included levels of charcoal consumption and production in the country, energy use per capita, electrification rates, deforestation rates, surface area committed to AFR100, and others.

The data analysis included the following components:

- frequency counts of keywords and word clouds to show the extent to which charcoal is explicitly recognized and acknowledged by policies;
- comparative tables of words used across countries to describe charcoal, its relevance and the dominant charcoal narratives being applied or promoted by policies;
- multivariate analysis to identify variations in "conduciveness", strategies and interventions; and
- a comparative analysis between countries to determine clusters of similar approaches that they employ.

Operationalizing "conduciveness'

To understand the relative conduciveness of policies across the study countries, a "conduciveness metric" was developed. Based on responses to 42 questions covering the five elements of conduciveness, the metric provides an overall summary measurement of the extent to which policies in a country are potentially favourable or not for charcoal interventions. As such, a conduciveness score was calculated for each country. The questions were designed to determine if the policy documents describe an enabling environment for a sustainable charcoal sector.

Charcoal mentions: establishes if policies discuss charcoal directly, recognize it as an energy source that is distinct from other biomass energies such as firewood or liquid biofuels;

The regulatory framework: establishes if governments provide a clear and non-conflictual set of policies and policy instruments, including strategies, laws and regulations, action plans and guidance for stakeholders;

Portrayals of charcoal: establishes if policies provide balanced and even favourable narratives of charcoal, charcoal producers and consumers and acknowledge its importance to energy security, livelihoods and economies;

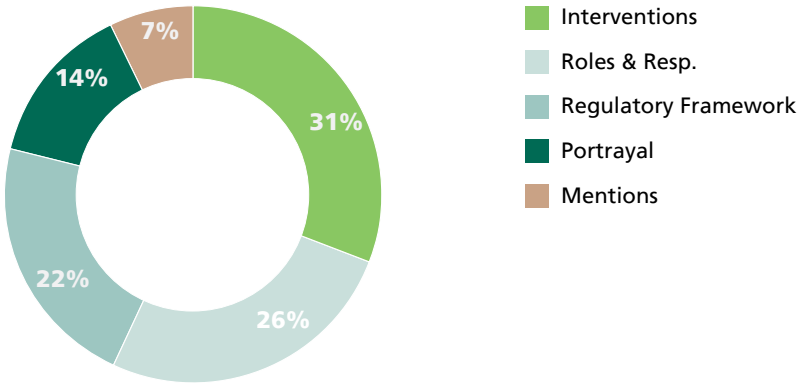
Interventions: establishes if policies propose interventions that address the full value chain and that match the challenges identified as linked to the charcoal sector; and

Roles and responsibilities: establishes if policies recognize the multisectoral nature of charcoal and acknowledge a diverse range of stakeholders as having roles and responsibilities and as being key to achieving multiple sustainability objectives.

For each element, a series of true/false questions was developed. "True" answers were assigned 1 point; "false" answers received zero points. The conduciveness score for a country was the sum of the scores of all responses. As such, the highest possible score was 42 and the lowest was zero. The 42 questions were not equally distributed across elements of conduciveness (see Figure A1). An affirmative response to a question ("true") indicates the existence of an element of an enabling environment.

Ultimately, the conduciveness scores were used to compare countries' policy environments and to explore what characteristics of countries best explain their scores. Table A1 lists the set of questions that were used to assess interventions.

Figure A1. Percentage of questions per assessment area for conduciveness measure



Source: Authors' own compilation.

Table A1. List of questions used to assess conduciveness of charcoal policies to sustainability interventions

No.	Question	Possible Response
1	Charcoal is mentioned more than 20 times (across all the documents).	True/False
2	Charcoal is mentioned explicitly in the documents.	True/False
3	Policy documents include statements that recognize the dependency on charcoal (or wood energy) as a cooking fuel.	True/False
4	The country lays out a strategy with specific targets to make charcoal sustainable. (e.g. 50% of sustainably produced charcoal by 2030).	True/False
5	Charcoal is mentioned explicitly in policy documents that belong to different sectors (e.g. Forestry AND Energy).	True/False
6	The country has developed a biomass energy strategy (BEST) or equivalent (e.g. Renewable energy strategy or Charcoal-Specific Strategy) (NOTE: SE4ALL strategies are not equivalent to BESTs).	True/False
7	A BEST or equivalent strategy is approved and/or operational (NOTE: SE4ALL strategies are not equivalent to BESTs).	True/False
8	The charcoal-relevant policy documents were updated or adopted in the last 10 years. (Document that mentions charcoal explicitly AND is updated <10yrs).	True/False
9	Policy documents articulate a regulatory framework that indicates how to produce charcoal legally.	True/False
10	Policy documents articulates a regulatory framework to supervise the sustainable production of charcoal.	True/False
11	The policy documents clarify the type of land tenure where charcoal can be produced legally (e.g. community forest, production forest).	True/False
12	Policy documents propose strategy or action plans for addressing the sustainability concerns of charcoal. (A list of more than three specific actions to put in place).	True/False
13	Policy documents recognize that charcoal consumption is not limited to low-income people.	True/False
14	Documents provide evidence-based assessment for the environmental impacts of charcoal. (e.g. Rely on high quality updated national study- at the minimum statements is not unrealistic).	True/False
15	Charcoal is not identified as the main driver of deforestation nationally.	True/False
16	Charcoal is considered an appropriate strategy for sustainable development (e.g. there are plans to make charcoal sustainable).	True/False
17	Policy documents include statements that recognize the role of charcoal for livelihoods and/or employment.	True/False
18	Charcoal-relevant policy documents in place was/were developed through stakeholders' consultation. (at least one)	True/False
19	Interventions are performed across the different stages of the supply chain.	True/False
20	Interventions are performed to promote alternative energy sources.	True/False
21	Interventions are performed to address both supply AND demand.	True/False
22	More than one sector discusses interventions on charcoal (see Figure 3 of country report).	True/False
23	Policy documents mention a levy, permit or tax for the production and/or transport of charcoal.	True/False

No.	Question	Possible Response
24	Only certified entities (producers, organizations) are permitted to produce charcoal on public or community lands.	True/False
25	Policy documents discussed the provision of extension services for sustainable forest management methods for charcoal.	True/False
26	Policy documents discussed the provision of extension services for efficient carbonization methods for charcoal.	True/False
27	Policy documents discuss a system of quotas for wood extraction for charcoal production.	True/False
28	Policy documents discuss the implementation of incentives for wood energy plantation/agroforestry. (e.g. tax incentives or subsidies)	True/False
29	Rules exist to support natural regeneration or reforestation by producers after extraction.	True/False
30	Policy documents discussed adoption of efficient consumption practices (e.g. improved stoves)	True/False
31	Policy documents discuss how to address corruption in the charcoal value chain (e.g. bribes).	True/False
32	Roles are clearly established for the governance of the charcoal sector. (Who is in charge of charcoal oversight and rule-making?)	True/False
33	Responsibilities for interventions are shared between different sectors.	True/False
34	Non-governmental actors are identified for their roles in the charcoal sector.	True/False
35	The governance of the charcoal sector is decentralized with some decision power at the local level.	True/False
36	There are no obvious conflicting strategies or responsibilities over charcoal oversight between sectors.	True/False
37	Governmental institutions have a clear role in improving sustainability of charcoal.	True/False
38	Responsibilities at the local administrative level are explained (e.g. chief local supervisor assesses the quota for wood harvesting).	True/False
39	Benefit-sharing mechanism is described for commercial extraction at the local level. (In terms of equity)	True/False
40	Policy documents explain government oversight of the private sector in charcoal. (e.g. licensing, quota, monitoring - any type of oversight)	True/False
41	Policy documents clarify the participation of other actors (private, NGOs, communities, etc.) in decision-making of the charcoal sector.	True/False
42	Policy documents mention an authority responsible for enforcing charcoal rules and regulations. (e.g. address illegal charcoal)	True/False

Source: Authors' own compilation.

For more information, please contact:

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